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## CHAPTER 2 – RESOURCE DIRECTION

### 2.1 Ecological Framework and the Conservation of Species

The following strategies, concepts, and components are used in this LRMP to establish an ecological framework for the conservation and management of ecosystems, habitats, and species. These are overarching strategies that have relevance to a wide range of program areas and agency actions occurring on TRFO and SJNF lands. They are especially important to the four program areas of terrestrial ecosystems and plant species, terrestrial wildlife, riparian and wetland ecosystems, and aquatic ecosystems (Sections 2.2–2.5).

#### 2.1.1 Sustainable Ecosystem Strategy

Ecosystems are communities of living organisms interacting with each other and with their physical environment (Kaufmann et al. 1994). They are dynamic systems that change in response to succession, climate, and the effects of disturbances, including those caused by fire, insects, disease, drought, wind, and humans. Humans are an integral part of ecosystems and depend on them for their short- and long-term well-being. In order to meet the social and economic needs of future generations, ecosystems are to be managed for sustainability. To ensure the long-term sustainability of ecosystems, humans must manage within the physical and biological capabilities of the land, maintain all of the ecological components and processes, and not irreversibly alter ecosystem integrity and resilience. The concept of sustainability is a fundamental component of the LRMP and is guided by the Multiple-Use Sustained-Yield Act (MUSY) and the FLPMA. The MUSY directs that federal lands are managed in a manner that provide a framework of social, economic, and ecological conditions that sustain native ecosystems, support a diversity of native plant and animal species, and provide a continuous flow of goods and services to the nation. The FLPMA directs that public lands be managed based on multiple use and sustained yield, as well as the protection of other values including, but not limited to, scenic, historical, ecological, environmental, air and atmospheric, and water resource values.

The MUSY identifies three interrelated and interdependent elements of sustainability for the USFS: social, economic, and ecological. Social and economic sustainability is associated with the provision of goods and services from the TRFO and SJNF to people and communities over the long term. Sustainability takes into account the social and economic conditions of the planning area, including recreational opportunities, multiple uses that contribute to local and regional economies, and cultural resources. Ecological sustainability is intended to provide the ecological conditions that maintain or restore the diversity of native ecosystems and natural disturbance processes. This in turn will maintain suitable habitats for a wide range of plant and animal species and provide for the diversity and viability of plant and animal species, populations, and communities. When applied effectively, the sustainable ecosystems strategy will result in ecological conditions similar to those under which native species evolved. Achieving these conditions offers some assurance against further losses of biodiversity (Seymore and Hunter 1999). Managing for ecological sustainability is intended to ensure that ecosystems of the TRFO and SJNF continue to maintain the ecological conditions necessary to provide goods and services needed by people and communities, now and in the future. This strategy is also consistent with the management of public lands as prescribed under the FLPMA.

The sustainable ecosystems strategy of the TRFO and SJNF includes 1) protected area designation and preservation (a coarse-filter approach), 2) ecosystem management using sustainable ecosystem concepts, 3) the development and application of plan components (desired conditions, objectives, standards, and guidelines) that provide a framework for the management and preservation of ecosystems, and 4) monitoring the effects of management activities on the TRFO and SJNF and the application of adaptive management principles. Effective monitoring and evaluation of how management activities are affecting ecosystems and species, and the correct application of adaptive management principles, will be critical to maintaining functional, sustainable ecosystems and addressing the needs of dependent species. Refer to Chapter 4 for a description of the SJNF and TRFO monitoring components.

### **2.1.2 Disturbances and the Historical Range of Variability**

Major disturbances, including those caused by fire, insects, disease, drought, wind, floods, and humans, can have a profound effect toward shaping the composition, structure, and function of ecosystems at multiple scales and in creating a heterogeneous pattern of vegetation communities and habitats across the planning area. Disturbances vary in magnitude, size, and frequency, some of which humans have little control over. Multiple disturbances can interact in complex ways and often act in concert, which can predispose ecosystems to more intense effects. Many of these disturbances have significant long-term effects on terrestrial, riparian area and wetland, and aquatic ecosystems. It is not a question of whether disturbances will happen, but when, where, and at what scale they will happen. Disturbances can have a major influence (adverse or beneficial) on the agencies' ability to achieve the desired conditions and objectives of the LRMP.

The Historical Range of Variability (HRV) of ecosystems is determined by major disturbances and also less dramatic changes occurring over a long period of time. HRV is an important concept used in the LRMP to guide the management of ecosystems and to achieve ecosystem sustainability. HRV provides a tool used to gain a better understanding of complex ecological systems. It can be used to establish an ecological baseline, allowing managers to identify trends, assess the need for ecological restoration, and evaluate the consequences of management activities (Kaufmann et al. 1994; Kulakowski and Veblen 2006; Landres et al. 1999; Moore et al. 1999; Swetnam et al. 1999; Veblen and Donnegan 2005). HRV describes a dynamic set of boundaries within which most native biota have persisted through time and across space (Landres et al. 1999; Swetnam et al. 1999).

Using a reference period of indigenous settlement that occurred from the 1500s to the late 1800s, HRV first describes the range of ecological conditions that occurred on TRFO and SJNF lands under more "natural" disturbance regimes. Conditions occurring during this period represent those that existed prior to European-American settlement, which introduced sweeping ecological changes due to activities such as large-scale timber harvest, livestock grazing, fire suppression, dams, consumptive water uses, and roads.

The HRV is then used to evaluate the current ecological conditions of ecosystems on TRFO and SJNF lands by comparing them to the ecological conditions that occurred during the reference period. The HRV concept assumes that as ecological conditions depart from the range of historic conditions (primarily due to human actions), the risk of species loss increases (Duffy et al. 1999). Since native species evolved under HRV conditions, maintaining a full range of similar conditions will offer some assurance against the loss of biodiversity (Seymore and Hunter 1999). As reflected in the desired conditions, objectives, and standards and guidelines that follow, the intent is to use HRV to better describe and understand ecosystems within TRFO and SJNF lands and to help develop attainable LRMP components that are intended to protect and sustain ecosystems and species, while meeting a variety of public needs where possible. The intent is not to mandate that HRV conditions be achieved in all cases.

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### **2.1.3 Protected Areas**

Protected areas are key components of the sustainable ecosystems strategy. Protected areas are lands especially dedicated to the protection and maintenance of biological diversity (International Union for Conservation of Nature 1994). They are large, mostly unaltered, undeveloped, and roadless lands that contain terrestrial, riparian area and wetland, and aquatic ecosystems at multiple scales. They serve as conservation reserves and refuges to protect the native biodiversity within them (Norton 1999; Noss 1991). They also provide wildlife movement corridors and landscape linkage areas that connect habitats and landscapes, which in turn facilitate the interaction of species.

Management objectives for protected areas on TRFO and SJNF lands include:

- Preserving habitats, ecosystems, and species in as undisturbed a state as possible;
- Conserving the area's biodiversity through protection, not through active management;
- Ensuring the integrity of its ecosystems; and
- Maintaining established ecological processes.

Establishing and preserving protected areas is a means to maintain ecosystem diversity, which presumably will protect the diversity and viability of native plant and animal species and communities, and the ecological processes occurring within those ecosystems. The maximum level of biodiversity will be preserved if the maximum diversity of habitats is represented in protected area networks (Noss and Peters 1995; Scott et al. 1993). The establishment and preservation of protected areas is analogous to the Nature Conservancy's (TNC) coarse-filter conservation approach, which is well-documented in the literature and has broad support in the scientific community (Hunter et al. 1988; Noss 1987; TNC 1982). Protected areas, which make up about 48% of public lands within the planning area, include wilderness areas, the Piedra Area, WSAs, research natural areas (RNAs), and CRAs (see Figure 2.1.1).

Unaltered, unroaded, high-elevation terrestrial, riparian, and wetland ecosystems are very well represented in protected areas on both SJNF and TRFO lands. These include alpine areas, spruce-fir forests, aspen forests, Thurber fescue mountain grasslands, riparian forests and shrublands, fens, and herbaceous riparian areas and wetlands. Unaltered, unroaded, mid-elevation ecosystems are also well represented in SJNF and TRFO protected areas. These include cool-moist mixed conifer forests, warm-dry mixed conifer forests, ponderosa pine forests, pinyon-juniper woodlands, mountain shrublands, Arizona fescue mountain grasslands, deciduous riparian forests and shrublands, and herbaceous riparian areas and wetlands. Unaltered, unroaded, low-elevation ecosystems are less common and not as well represented in protected areas in the planning area. These include sagebrush shrublands, semi-desert shrublands and grasslands, deciduous riparian forests, and hanging gardens. For aquatic ecosystems, both lotic (running water) and lentic (standing water) ecosystems are well represented throughout the network of protected areas in the planning area. However, these waters are almost exclusively cold water systems. Warm water systems are not well represented within the SJNF and TRFO protected areas.

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### **2.1.4 Ecosystem Management**

Ecosystem management is an important integrating component of the sustainable ecosystems strategy. Ecosystem management uses an ecological approach to blend the social, economic, and ecological needs and values to assure productive, sustainable ecosystems, perpetuate natural disturbance regimes, and allow human uses that do not result in long-term ecological degradation (Kaufmann et al. 1994; Noss and Cooperrider 1994). Outside the designated protected areas described above, a wide range of public uses and management activities occur on TRFO and SJNF lands. For these lands, the application of sustainable ecosystem management principles is critical to maintaining ecosystems, providing for biological diversity, and maintaining populations of fish, wildlife, and plant populations. Ecosystem management on SJNF and TRFO lands, which uses the HRV for reference, will be implemented by maintaining or restoring the composition (plant species, animal species, and vegetation types), structure (size, density, and arrangement of live and dead vegetation, stream channel attributes), function (ecological processes and disturbances), and physical environment (soils, water, and geomorphology) of ecosystems. Ecological assessments specific to the SJNF and TRFO are used to describe current ecological conditions in and adjacent to the planning area (Romme et al. 2009; USFS 2005a). The ecosystem management approach will be implemented at multiple scales using terrestrial, riparian area and wetland, and aquatic ecosystems as the primary analysis units. The approach is intended to protect and maintain these ecosystems and ensure the diversity and population viability of the majority of species within them.

### **Species Management Strategy**

Species that may not be adequately recognized or protected by the above ecosystems management approach, or whose specific habitat needs or other life requirements may not be fully met under the sustainable ecosystems strategy, will be given special management considerations, including the development of LRMP components that contribute to the conservation of those species. This species conservation approach is analogous to TNC's fine-filter approach that protects species with known conservation concerns (Hunter et al. 1988; Noss 1987; TNC 1982). The species conservation approach may be needed for species at risk of extinction, species that are highly vulnerable to disturbances, species whose habitat includes rare ecological components (rare soil types or geologic types) that occur at a very small scale, and species with unique hydrologic conditions. This approach may also be needed for special status species whose key habitat components are directly affected by agency management activities.

## **Special Status Species and Management Indicator Species**

Special status species on TRFO and SJNF lands include federally listed species, species proposed for federal listing, candidate species for federal listing, Region 2 Regional Forester's sensitive species, and Colorado BLM State Director's sensitive species. Some of these species have immediate needs that may not be adequately recognized and addressed by the overall sustainable ecosystems strategy. As such, they are given special consideration, and additional LRMP components have been developed to address those special needs. In addition, current species-specific conservation plans and strategies are relied upon to address the needs of special status species. These plans and strategies are discussed within the applicable resource sections below and are analogous to TNC's fine-filter approach. LRMP components specific to special status species augment those components developed through the ecosystem management approach. A list of special status species can be found in Volume III, Appendix P.

USFS Management Indicator Species (MIS) serve several related functions in LRMP development and implementation. MIS are typically selected due to their responsiveness to land management activities and represent groups of species with similar needs. With these applications in mind, MIS are used to develop LRMP objectives for fish and wildlife populations and their habitats, analyze the degree to which LRMP alternatives meet those objectives, and ultimately monitor the effectiveness of LRMP implementation. Changes in MIS populations, or their habitats, may indicate how management has affected the composition, structure, or function of habitats and ecosystems, and help determine the need for change. The planning requirement to identify and address MIS is applicable only to NFS lands (36 CFR 219) and is not required by BLM planning regulations. The BLM does not identify MIS but instead monitors and reports on sensitive species populations as directed in BLM Manual 6840 (BLM 2008).

Species considered for inclusion as MIS on SJNF lands were developed using the following five categories:

- Endangered and threatened plant and animal species identified on state and federal lists;
- Species commonly hunted, fished, or trapped;
- Non-game species of special interest;
- Species with special habitat needs that may be influenced significantly by planned management programs; and
- Additional plant or animal species selected because their population changes are believed to indicate the effects of management activities on water quality.

## **Biological Diversity and Population Viability**

The maintenance of biological diversity and population viability on SJNF and TRFO lands are addressed directly or inferred under a variety of laws, regulations, and policies specific to each agency. These include the NFMA, the MUSY, the FLPMA, and the Endangered Species Act of 1973 (ESA). Some of the supporting federal regulations, departmental regulations, and departmental manual direction include 36 CFR 219.19, Forest Service Manual (FSM) 2620, FSM 2622.01, and U.S. Department of Agriculture (USDA) Departmental Regulation 9500-4.

For lands managed by the USFS, 36 CFR 219.19 specifically requires that "[f]ish and wildlife habitat shall be managed to maintain viable populations of existing native and desired non-native vertebrate species in the planning area," and "[f]or planning purposes, a viable population shall be regarded as one which has the estimated numbers and distribution of reproductive individuals to insure [sic] its continued existence is well distributed in the planning area." Regulation 36 CFR 219.26 requires that "[f]orest planning shall provide for diversity of plant and animal communities and tree species consistent with the overall multiple-use objectives of the planning area. Such diversity shall be considered throughout the planning process." In addition, the FLPMA specifies that special uses granted by the Secretary of Agriculture or the Secretary of the Interior are subject to terms and conditions that "minimize damage to fish and wildlife habitat and otherwise protect the environment." Agency actions should avoid or minimize impacts to species whose viability has been identified as a concern. USFS actions must not result in loss of population viability or create significant trends toward federal listing (FSM 2670.32).

BLM Colorado's Standards for Public Land Health (BLM Manual H-4180-1) describe the resource conditions and acceptable management practices for BLM lands. Standards of land health are expressions of levels of physical and biological condition or degree of function required for healthy lands and sustainable uses, and define minimum resource conditions that must be achieved and maintained. Standards are applied on a landscape scale and relate to the potential of the landscape. Standard 2 requires that riparian habitat associated with perennial streams functions properly, provides habitat, provides biodiversity, and meets water quality standards. Standard 3 specifies that wildlife and fish communities are maintained at viable population levels commensurate with habitat potential. Standard 4 requires that special status species and their habitats are maintained and enhanced.

In addition, the BLM's Special Status Species Management Manual requires that methods and procedures be identified in land use plans that ultimately bring sensitive species and their habitats to a condition in which management under sensitive species policies is no longer necessary (BLM Manual Section 6840.2B).

The SJNF and TRFO sustainable ecosystems and species management strategies combine to provide a foundation for addressing the legal, regulatory, and policy requirements described above. The underlying assumption is that implementing a management strategy that maintains sustainable ecosystems, along with a species strategy that addresses the specific needs of selected species, will provide for species diversity and long-term population viability, in as much as species diversity and population viability can be tied to the management of local federal lands. These two strategies are implemented through the LRMP components, which provide a framework for the management and protection of ecosystems, populations, and individual species occurring on SJNF and TRFO lands.

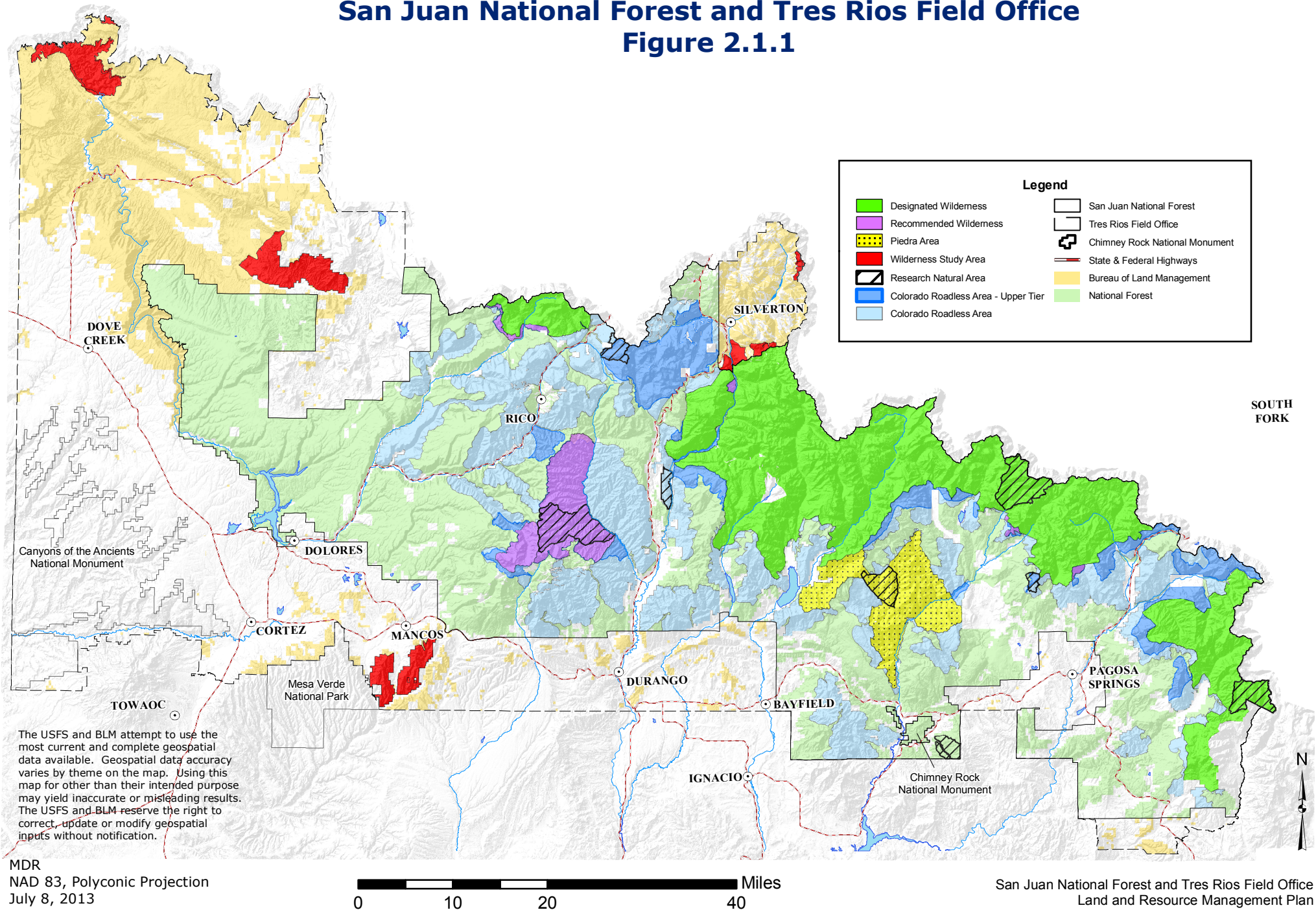
For each of the aforementioned ecosystem categories (riparian area and wetland ecosystems, aquatic ecosystems, and terrestrial ecosystems), specific management direction has been developed that is intended to address the legal, regulatory, and policy requirements for species diversity and population viability described above. The process applied was to identify a range of key ecosystem elements, determine the importance of those elements to maintaining species diversity and population viability (e.g. limiting factors), define desired future conditions and land management objectives for those elements, and ensure that appropriate management standards and guidelines are in place that address the ecological needs of species and populations. In general, management standards have been developed for those elements determined to have an overriding influence on species diversity or long-term population viability, while other elements that have less influence are typically addressed through the application of guidelines.



# Protected Areas

## San Juan National Forest and Tres Rios Field Office

### Figure 2.1.1



## 2.2 Terrestrial Ecosystems and Plant Species

### Introduction

Terrestrial ecosystems on the SJNF and TRFO occur in upland landscape positions where they depend on water derived from direct precipitation. They contain soils that are moderately well to very well drained and plants that are obligate-upland or facultative-dry species (Reed 1988). Terrestrial ecosystems are defined by soils, climate zones, and major vegetation types, the latter used for naming the ecosystems. Terrestrial ecosystems on the SJNF and TRFO include spruce-fir forests, aspen forests, cool-moist mixed conifer forests, warm-dry mixed conifer forests, ponderosa pine forests, pinyon-juniper woodlands, mountain shrublands, sagebrush shrublands, semi-desert shrublands, mountain grasslands, semi-desert grasslands, and alpine (Redders 2012). Topographic variability (which includes mountains, hills, and tablelands), diverse geology (associated with volcanism, metamorphism, sedimentation, and glaciation), and microclimatic features (soil moisture regime, soil temperature regime, aspect, and elevation) add to the diversity of terrestrial ecosystems on the SJNF and TRFO.

Terrestrial ecosystems encompass a majority of the land base and accompanying resources on SJNF and TRFO lands. Hence, management of these ecosystems is a critical part of the LRMP's sustainable ecosystems strategy, as previously described in Section 2.1.

Terrestrial ecosystems are used in the LRMP and FEIS to describe ecosystem diversity; analyze past, current, and future ecological conditions; describe environmental impacts from management activities; and provide for the development of LRMP components (desired conditions, objectives, standards, and guidelines). These ecosystems serve as broad-scale habitat types for terrestrial wildlife species, special status wildlife species, MIS, and plant species, and as such provide habitat conditions that maintain species diversity and population viability for most terrestrial wildlife and plant species. Terrestrial ecosystems and their ecological components will be monitored to determine if impacts from management activities are adversely affecting the composition, structure, abundance, distribution, and population viability of the plant and animal species that rely on those ecosystems for their habitat needs.

Terrestrial ecosystems and the ecological indicators associated with them are used in the LRMP and FEIS to detect changes to the ecosystems and species due to management activities, natural disturbances, and climate change. Physical indicators for terrestrial ecosystems include, but are not limited to, changes in soil conditions, changes to forested stand structure and distribution, and the abundance and distribution of desirable native plants species. Biological indicators include, but are not limited to, native plant species diversity, impacts to special status plant species and other rare plant species, and changes to the extent and distribution of invasive plants.

Plant species are an important component of terrestrial ecosystems on SJNF and TRFO lands. Ecological conditions that provide for ecosystem sustainability and diversity are the context for the evaluation and management of plant species. Managing for sustainable ecosystems by maintaining or restoring the composition, structure, and function of the terrestrial ecosystems, aquatic ecosystems, and riparian area and wetland ecosystems on SJNF and TRFO lands will protect and sustain the diversity of those ecosystems and the majority of species within them, but additional management emphasis is needed for some species that may not be adequately protected by the sustainable ecosystems strategy. The complementary special status species strategy (fine-filter) is intended to provide a safety net for rare species whose specific habitat needs or life requirements may not be fully met under the sustainable ecosystems strategy. This strategy may be needed for species at risk of extinction, species whose habitat includes rare ecological components (rare soil types or geologic types) that occur at a very small scale, species with viability concerns, species that are highly vulnerable to disturbance, and species with unique hydrologic condition needs. This strategy may also be needed for special status plant species that occur on lands where active management activities have a high probability of adversely affecting them.

There are currently a total of 38 special status plant species on the SJNF and TRFO. This includes three federally listed species, one candidate for federal listing, and 34 sensitive species. Designated critical habitat for one of the federally listed plant species also occurs on TRFO and SJNF lands. Currently, most special status plant species on SJNF and TRFO lands appear to have stable populations and trends. A list of the special status plant species known to occur or with habitat on the SJNF or TRFO is found in Volume III, Appendix P, along with a brief description of the habitats where they occur.

## Background

Disturbances, including those caused by fire, insects, disease, drought, wind, floods, and humans (e.g., Native Americans and their burning practices) have played a fundamental role in shaping the composition, structure, and function of terrestrial ecosystems on SJNF and TRFO lands and in creating the heterogeneous pattern of vegetation that occurs across the planning area.

Past management activities (including historic timber harvest, oil and gas development, livestock grazing, recreation, fire suppression, utility corridor construction, and solid minerals development) resulted in many adverse impacts to the soils and vegetation of terrestrial ecosystems throughout the SJNF and TRFO over the last 100 years. Impacts from many of these activities, particularly those associated with oil and gas development, timber harvest, and past, unmanaged livestock grazing, are still evident. Many ponderosa pine forests and warm-dry mixed conifer forests have been significantly altered by heavy livestock grazing that began in the late 1800s, and later by timber harvest and fire suppression (Romme et al. 2009). Heavy livestock grazing decreased the abundance and distribution of native grasses that helped carry surface fire through these forests. Logging reduced the abundance and distribution of very large (and often very old) ponderosa pine (*Pinus ponderosa*) (and more recently, Douglas-fir [*Pseudotsuga menziesii*]), particularly on more accessible, gentle to moderate slopes.

Fire suppression began following the devastating fires of 1910 in the Northern Rockies. Coupled with the reduction in cover and amount of bunch grasses from grazing, much of the planning area (and other western forests and public lands) has undergone over 130 years of fire exclusion. These activities have 1) eliminated the frequent, low-severity fires that burned in these forests every 12 to 30 years (Grissino-Mayer et al. 2004); 2) altered plant species composition, vegetation stand structure, and fire regimes of many ponderosa pine forests and warm-dry mixed conifer forests on the SJNF and TRFO; and 3) created more homogenous vegetation conditions across the planning area. This has resulted in heavy accumulations of dead vegetation (including tree boles, tree and shrub branches, and leaves) and an abundance of stands with high tree densities and more closed canopy covers compared to HRV conditions. This has increased the risk—and occurrence—of epidemic insect and disease outbreaks (Schmid and Mata 1996); increased the risk of destructive wildfires that are larger, spread more rapidly, and are much hotter than they used to be making them increasingly difficult to control (Moir et al. 1997); allowed white fir (*Abies concolor*) (a shade-tolerant species) to increase; and reduced ponderosa pine regeneration (Moir et al. 1997; Wu 1999). Many ponderosa pine forests on the SJNF and TRFO are currently outside their HRV in terms of vegetation stand structure and fire frequency (Grissino-Mayer et al. 2004; Romme et al. 2009). Ponderosa pine and warm-dry mixed conifer forests also have less acres in both young and old growth development stages and have less diversity and less cover of native grasses compared to HRV conditions.

Other terrestrial ecosystems on SJNF and TRFO lands whose current conditions differ significantly from HRV conditions include 1) mountain grasslands, semi-desert shrublands, semi-desert grasslands, sagebrush shrublands, and pinyon-juniper woodlands, all of which have less diversity and less cover of native grasses compared to HRV conditions due to past and ongoing livestock management; 2) spruce-fir and cool-moist mixed conifer forests that have less acres in the young and mid development stages; and 3) aspen forests that have less acres in the young development stage. Some alpine ecosystems also display impacts associated with long-term domestic sheep grazing, recreation, and mining.

Approximately 57% of the SJNF and 11% of TRFO lands are within protected areas. A majority of the protected areas on the SJNF are found in high-elevation wilderness areas and mid-elevation roadless areas on the eastern two-thirds of the SJNF. Alpine areas, spruce-fir, aspen, cool-moist mixed conifer,



and warm-dry mixed conifer are well represented in these areas. Mountain grasslands dominated by Thurber fescue (*Festuca thurberi*), as well as mountain shrublands, and ponderosa pine are also well represented on the SJNF. Pinyon-juniper is well represented in protected areas found on TRFO lands. Desert shrublands, desert grasslands, and sagebrush are also found in protected areas on TRFO lands, but are not well represented.

Less than half of the special status plant species on SJNF and TRFO lands are found in habitats that are well represented within protected areas. Each of the federally listed plant species and the candidate for federal listing are found at low elevations outside protected areas or in habitat types that are not well represented in protected areas. Of the 29 sensitive plant species known to occur or with habitat on the SJNF and TRFO, 16 occur within areas well represented in protected areas (including fens, high-elevation wetlands, and alpine habitat). The remaining 13 species are found at lower elevations in habitats poorly represented or entirely absent from protected areas. This includes, but is not limited to, hanging gardens, low-elevation riparian areas and wetlands, and specific soil types such as gypsum and shale soils.

The management of terrestrial ecosystems and plant species on SJNF and TRFO lands includes protecting and sustaining the composition, structure, and function of the terrestrial, aquatic, and riparian/wetland ecosystems and the diversity and viability of the species within them, including special status plant and wildlife species. It also includes designating and preserving protected areas and reference sites; maintaining adequate ground cover (vegetation and litter); protecting the physical, chemical, and biological properties of soils; maintaining and restoring soil productivity; and preventing or minimizing adverse impacts from management actions. Tools for managing terrestrial ecosystems and plant species also includes using the best available science; developing vegetation and ecological classification systems; conducting vegetation, special status plant species, soils, and ecological inventories; identifying soil types and soil properties; identifying plants and plant communities; conducting biological assessments and evaluations; monitoring; and establishing RNAs, Areas of Critical Environmental Concern (ACECs), and special botanical areas.

Several LRMP components below and in other sections refer to NatureServe conservation status rankings (NatureServe 2013). NatureServe and its member Natural Heritage Programs have developed a consistent method for evaluating the relative imperilment of both species and ecological communities based on the best available science. These assessments lead to the designation of a conservation status rank. The three broad categories that factor into these rankings include rarity, trends, and threats. Conservation status rankings include secure (G5), apparently secure (G4), vulnerable (G3), imperiled (G2), critically imperiled (G1), possibly extinct or eliminated (GH), and presumed extinct or eliminated (GX). The Colorado Natural Heritage Program provides a similar state-wide conservation status rank (reported as "S" rankings). The USFS and BLM have a long history of partnership with NatureServe, and have collaborated on a broad range of projects in such areas as planning, sensitive species inventory and assessments, ecological classification and mapping, and data sharing and technology development.

## Desired Conditions

- 2.2.1 The composition, structure, and function of terrestrial ecosystems are influenced by natural ecological processes, including disturbance events such as fire, infestations by insects or disease, winds, and flooding.
- 2.2.2 Non-climate ecosystem stresses (e.g., high road densities, water depletions, air and water pollution) are reduced to improve the resilience and resistance of ecosystems to the future dynamics of a changing climate.
- 2.2.3 Key ecosystems that are not functioning properly are realigned/restored/renovated to survive the near-future dynamics of changing climate.
- 2.2.4 Future biodiversity, especially for endangered, rare, or dwindling species, is protected in the face of a changing climate by safeguarding habitats, preserving genetic diversity, and cooperating with seed banking efforts that provide secure, long-term storage of plant genetic resources.

- 2.2.5 Terrestrial ecosystems have a diverse composition of desirable native plants that are vigorous and self-perpetuating. Invasive plant species are absent or rare.
- 2.2.6 All development stages of the forested terrestrial ecosystems are well represented at the landscape scale and occur within the ranges identified in Tables 2.2.1 and 2.2.2.
- 2.2.7 Old growth ponderosa pine, old growth pinyon-juniper and old growth warm-dry mixed conifer forests are more abundant, occupy more acreage, and are well distributed on SJNF and TRFO lands.
- 2.2.8 Aspen forests display larger patches of the young-development stage.
- 2.2.9 Terrestrial ecosystems, including habitat for special status plant species, are productive, sustainable, and resilient, and provide goods and services over the long-term.
- 2.2.10 Forested terrestrial ecosystems display a Fire Regime Condition Class of 1.
- 2.2.11 Canyon escarpments, and the terrestrial ecosystems that occur on them, serve as refugia for native biota. These escarpments are associated with the following canyons: Lower Dolores River, Wild Steer, Coyote Wash Spring, McIntyre, Summit, Big Glade, Lake, Doe, Narraguinnep, Cabin, Ferris, Salter, Spruce Water, and Lost. They also include the Mesa Verde Escarpment.
- 2.2.12 The abundance and distribution of native grasses in semi-desert grasslands, sagebrush shrublands, pinyon-juniper woodlands, and semi-desert shrublands are maintained or increased.
- 2.2.13 The abundance and distribution of Arizona fescue (*Festuca arizonica*) in ponderosa pine forest and in Arizona fescue mountain grasslands are maintained or increased.
- 2.2.14 Aspen forests, ponderosa pine forests, pinyon-juniper woodlands, sagebrush shrublands, semi-desert shrublands, mountain grasslands, and semi-desert grasslands that occur in suitable rangelands have a diverse composition of native bunchgrasses that are vigorous and self-perpetuating.
- 2.2.15 Forested terrestrial ecosystems have stand structures and tree species composition that offer resistance and resilience to changes in climate, including extreme weather events, or epidemic insect and disease outbreaks.
- 2.2.16 Non-forested terrestrial ecosystems have community structure and species composition that offer resistance and resilience to changes in climate, including extreme weather events, or epidemic insect and disease outbreaks
- 2.2.17 Local seeds of desirable native plant species are available for revegetation and restoration efforts.
- 2.2.18 Suitable habitats for species vulnerable to climate change exist and serve as seed sources for revegetation and restoration efforts.
- 2.2.19 The SJNF and TRFO forested ecosystems provide net positive carbon storage.
- 2.2.20 Five-needle pine species (southwestern white pine [*Pinus strobiformus*], limber pine [*P. flexilis*], and bristlecone pine [*P. aristata*]) are maintained as a component of forested ecosystems.
- 2.2.21 High-elevation stands dominated by aspen (*Populus tremuloides*) will be maintained or increased over time to ensure the persistence of aspen on the landscape in light of declining aspen health and loss of aspen in lower elevations associated with a warmer and drier climate.

- 2.2.22 Ponderosa pine, warm-dry mixed conifer, and cool-moist mixed conifer forest stands that are in the old growth development stage and that have not been previously harvested are managed for their old growth values through active or passive management.
- 2.2.23 **Ponderosa Pine Forests** - Ponderosa pine forests display variable density and structure. Most stands reflect uneven-age structure comprising variable-sized, even-aged clumps of trees. Clumps vary in size, ranging from as few as three trees to as many as 20 or more trees. Tree clumps vary in density from widely spaced large trees to tightly spaced small trees. Collectively, these forests contain multiple canopy layers. Between or surrounding these clumps are shrub- and/or grass/forb-dominated openings. Ponderosa pine seedlings and saplings are present, as are large old, yellow-barked ponderosa pine trees. The presence of other tree species—e.g., Douglas-fir, white fir, blue spruce (*Picea pungens*), or Rocky Mountain juniper (*Juniperus scopulorum*)—is infrequent to rare. The abundance and distribution of Gambel oak (*Quercus gambelii*) and other native shrubs in the understory of these forests is variable and includes small and large patches of all size classes. Native grasses and forbs (including bunchgrasses, Arizona fescue, muttongrass [*Poa fendleriana*], and mountain muhly [*Muhlenbergia montana*]) are present and well distributed in most ponderosa pine forests. Forest litter is common, though highly variable in depth and extent due to fire. Invasive plant species are absent or rare. Presence of snags or large wood (on the ground) is also highly variable due to fire. Low-intensity, high-frequency surface fires are common in most ponderosa pine forests (with frequencies ranging from about 12 to 30 years).
- 2.2.24 **Warm-Dry Mixed Conifer Forests** - Warm-dry mixed conifer forests display variable density and structure, similar to ponderosa pine forests, with added complexity in species composition. Most stands reflect uneven-age structure composed of variable-sized, even-aged clumps of trees. Some have open canopies with widely spaced trees, especially on warmer aspects; some are dense with more closed canopies (e.g., on cooler aspects). Composition is dominated by ponderosa pine. Douglas-fir is a typical minor component. Trees range from young to old. White fir, blue spruce, or limber pine may be present, but infrequent. Shrub- and/or grass/forb-dominated openings are common. The abundance and distribution of Gambel oak and other native shrubs in the understory of these forests is variable, and includes small and large patches of all size classes. Native grasses and forb (including tall bunchgrasses) are common and well distributed in most warm-dry mixed-conifer forests. Invasive plant species are absent or rare. Forest litter is common, though variable in depth and extent due to fire. Presence of snags or large wood (on the ground) is also variable due to fire. Low-intensity, surface fires occur in most warm-dry mixed conifer forests (with frequencies ranging from about 18 to 28 years). Tree species composition is closely tied to fire frequency, with Douglas-fir and white fir (or blue spruce) increasing during longer fire-free periods, and ponderosa pine increasing during shorter fire-free periods.
- 2.2.25 **Cool-Moist Mixed Conifer Forests** - Cool-moist mixed conifer forests display variable stand structures and species composition. Most are dense with closed canopies and multiple canopy layers. Tree species composition includes an abundance of Douglas-fir trees (ranging from young to old); other species include white or subalpine fir (*Abies lasiocarpa*), blue or Engelmann spruce (*Picea engelmannii*), aspen, or limber pine. Patches of cool-moist mixed conifer forest, ranging from small to large, are distributed across the landscape. The canopy cover of shrubs in the understory of these forests is highly variable. Native grasses and forbs are common and well distributed in most cool-moist mixed conifer forests. Forest litter is common and well distributed. Invasive plant species are absent or rare. Snags and large wood (on the ground) are abundant in late successional stages. Mixed-severity fires occur in most cool-moist mixed conifer forests (with frequencies of about 144 years). All development stages of these forests are well represented.

- 2.2.26 **Spruce-Fir Forests** - Spruce-fir forests display variable stand structures and species composition. Engelmann spruce is generally dominant; subalpine (or corkbark) fir makes up a lesser, but common, component. Bristlecone pine (*Pinus longaeva*), limber pine, aspen, white fir, or Douglas-fir are infrequent to rare and usually found on warmer, drier aspects. Most spruce-fir forests are dense with closed canopies and multiple canopy layers. Patches of spruce-fir forest, ranging from small to large, are distributed across the landscape. The canopy cover of shrubs in the understory of these forests is highly variable. High-elevation spruce-fir forest can have bristlecone pine, but is rare. Native grasses and forbs are common and well distributed in most spruce-fir forests. Forest litter is common and well distributed. Invasive plant species are absent or rare. Snags and large wood (on the ground) are abundant in most development stages. High-intensity, stand-replacement fires can occur in most spruce-fir forests (with frequencies longer than 200 years); most fires are of limited scale and variable intensity. All development stages of these forests are well-represented.
- 2.2.27 **Aspen Forests** - Aspen forests display simple to variable stand structures—generally simple where conifer is rare or absent or variable where conifer comprise a substantial portion (up to 49% of the canopy cover). Patches of aspen, ranging from small to large, are distributed across the landscape. Aspen is infrequent to rare in the lowest- and highest-elevation forests (ponderosa pine and spruce-fir, respectively), and common throughout mixed conifer forests. The canopy cover of shrubs in the understory of these forests is highly variable. Native grasses and forbs are abundant and well distributed in most aspen and aspen-conifer forests. Forest litter is common and well distributed. Invasive plant species are absent or rare. Snags and large wood (on the ground) are abundant in late successional stages. Fire frequency in aspen stands is about 140 years. All development stages of these forests are well-represented.
- 2.2.28 **Pinyon-Juniper Woodlands** - Pinyon-juniper woodlands display variable stand structures. Some have open structures with widely spaced trees; others are dense with high canopy covers. Most stands are uneven aged. Tree species composition varies in pinyon pine (*Pinus edulis*) and/or juniper (*Juniperus* sp.) abundance, ranging from young to old. The canopy cover and size of Gambel oak, sagebrush (*Atriplex* sp.), and other shrubs in the understory of these forests is variable. Native grasses and forbs are present and well distributed. Biological soil crusts and litter are common and well distributed on most sites. Invasive plant species are absent or rare. High-intensity, stand-replacement fires occur in most pinyon-juniper woodlands (with frequencies of 100 to 123 years).
- 2.2.29 **Mountain Shrublands** - Mountain shrublands display variable stand structures. Most are dense with high canopy cover; others are open with widely spaced shrubs. Gambel oak and other deciduous native shrubs (including mountain mahogany [*Cercocarpus montanus*], serviceberry [*Amelanchier* sp.], chokecherry [*Prunus virginiana*], fendlerbush [*Fendlera rupicola*], and squaw apple [*Peraphyllum ramosissimum*]) are abundant and well distributed. Native grasses and forbs are abundant and well distributed. Invasive plant species are absent or rare. Litter is common and well distributed. High-intensity, replacement fires occur in most mountain shrublands.
- 2.2.30 **Sagebrush Shrublands** - Sagebrush shrublands display variable stand structures. Some are open with widely spaced shrubs; others are dense. Some large patches are present. Sagebrush and other native shrubs are abundant and well distributed. Native perennial grasses (including Indian ricegrass [*Oryzopsis hymenoides*], galleta [*Pleuraphis* sp.], western wheatgrass [*Pascopyrum smithii*], and needle and thread [*Hesperostipa comata*]) are abundant and well distributed. Encroachment of pinyon and juniper trees is absent or rare. Invasive plant species are absent or rare. Biological soil crusts are common and well distributed on many sites. High-intensity, replacement fires occur in most sagebrush shrublands.
- 2.2.31 **Semi-Desert Shrublands** - Semi-desert shrublands are dominated by native shrubs that could include shadscale saltbush (*Atriplex confertifolia*), winterfat (*Krascheninnikovia lanata*), fourwing saltbush (*Atriplex canescens*), plains pricklypear (*Opuntia polyacantha*), rubber rabbitbrush (*Ericameria nauseosa*), spiny hopsage (*Grayia spinosa*), greasewood (*Sarcobatus* sp.), and/or basin big sagebrush (*Artemisia tridentata* ssp. *tridentata*). Stand structures display open or

moderately dense shrubs with native perennial grasses and forbs in the openings between them. Native grasses (including Indian ricegrass, galleta, western wheatgrass, and needle and thread) are abundant and well distributed. Invasive plant species and/or undesirable native plant species that are currently abundant on most sites are absent or rare. Biological soil crusts and litter are common on most sites.

- 2.2.32 **Semi-Desert Grasslands** - Semi-desert grasslands are dominated by native perennial bunchgrasses (including Indian ricegrass, galleta, and needle and thread). Invasive plant species and/or undesirable native plant species that are currently abundant on most sites are absent or rare. Biological soil crusts and litter are common on most sites.
- 2.2.33 **Mountain Grasslands** - Mountain grasslands display moderate to high canopy cover of desirable native grasses and forbs (including Arizona fescue at mid elevations and Thurber fescue at higher elevations). Invasive plant species and undesirable native plant species that are currently abundant on many sites are absent or rare. Litter is common and well distributed.
- 2.2.34 **Alpine** - Alpine terrestrial ecosystems sustain their ecosystem diversity. They display a diverse composition of desirable native plant species and vegetation communities (including fellfield and turf types). Invasive plant species are absent or rare.
- 2.2.35 Soil productivity is maintained at site potential or is trending towards site potential.
- 2.2.36 Long-term levels of soil organic matter and soil nutrients (including soil carbon) are maintained at sustainable levels.
- 2.2.37 Ground cover (vegetation and litter) is adequate to protect soils and prevent erosion.
- 2.2.38 Management-induced soil erosion, soil compaction, soil displacement, puddling, and/or severely burned soils are rare on terrestrial ecosystems of the SJNF.
- 2.2.39 Upland soils exhibit infiltration and permeability rates that minimize surface runoff and allow for the accumulation of the soil moisture necessary for plant growth and ecosystem function.
- 2.2.40 Biological soil crusts are maintained or increased in pinyon-juniper woodlands, sagebrush shrublands, semi-desert shrublands, and semi-desert grasslands.
- 2.2.41 Fens, wetlands, and hanging gardens have the water sources and hydrologic systems necessary to support and sustain the special status plant species associated with them.
- 2.2.42 Shale and gypsum soils have the characteristics necessary to support and sustain the special status plant species associated with them.
- 2.2.43 Soils that provide habitat for all special status plant species maintain the soil conditions necessary to support and sustain those species.
- 2.2.44 Areas that are identified as critical habitat or proposed critical habitat for federally listed plant species have the characteristics necessary to provide for the growth and reproduction of the federally listed plant species for which they were designated.

**Table 2.2.1: Desired Conditions for Development Stages on the San Juan National Forest – National Forest Lands Only**

Terrestrial Ecosystem	Development Stage	Structural Stage*	Current Condition NFS Lands (% of veg type)	Desired Condition NFS Lands (% of veg type)	Historic Range of Variation (% of veg type)	Current % of Veg Type in Old Growth**	Desired % of Veg Type in Old Growth**
Spruce-fir forest	Young	2	2	10–20	0–45	26.50%	25–35%
	Mid-open	3a	4	10–15	5–47%		
	Mid-closed	3b,c	3	10–15	5–47%		
	Mature-open	4a	15	15–20	#		
	Mature-closed	4b,c	77	15–20	#		
Cool-moist mixed conifer forest	Young	2	0	10–20	1–36	17.00%	20–30%
	Mid-open	3a	1	10–15	8–49		
	Mid-closed	3b,c	5	10–15	8–49		
	Mature-open	4a	7	15–20	#		
	Mature-closed	4b,c	87	15–20	#		
Warm-dry mixed conifer forest	Young	2	0	5–10	1–10	13.10%	20–30%
	Mid-open	3a	1	5–10	5–14		
	Mid-closed	3b,c	6	5–10	5–14		
	Mature-open	4a	11	35–45	#		
	Mature-closed	4b,c	82	15–25	#		
Ponderosa pine forest	Young	2	0	5–10	1–14	4.30%	10–15%
	Mid-open	3a	3	5–10	4–14		
	Mid-closed	3b, c	2	5–10	4–14		
	Mature-open	4a	42	40–60	#		
	Mature-closed	4b,c	53	15–25	#		
Aspen forest	Young	2	10	15–25	1–55	4.30%	5–15%
	Mid-open	3a	3	10–15	4–55		
	Mid-closed	3b,c	19	15–20	4–55		
	Mature-open	4a	7	25–30	35–86		
	Mature-closed	4b,c	61	25–30	35–86		

\* 2, 3, and 4 refer to tree size (diameter at breast height [dbh]): 2 = <1 inch dbh; 3 = 1–8.99 inches dbh; 4 = >9 inches dbh; a, b, and c refer to tree crown closure percent in a stand : a = < 40%; b = 40–70%; c = >70%.

\*\* Old growth inclusions may be found in various habitat structural stages within each vegetation type.

# = No data available.

**Table 2.2.2: Desired Conditions for Development Stages on Tres Rios Field Office Lands – Bureau of Land Management Lands Only**

Terrestrial Ecosystem	Development Stage	Structural Stage <sup>*</sup>	Current Condition BLM Lands (% of veg type)	Desired Condition BLM Lands (% of veg type)	Historic Range of Variation (% of veg type)
Spruce-fir forest	Young	1,2	0	10–20	0–45
	Mid-open	3a	12	10–15	5–47%
	Mid-closed	3b,c	4	10–15	5–47%
	Mature-open	4a	14	15–20	#
	Mature-closed	4b,c	69	15–20	#
Cool-moist mixed conifer forest	Young	1,2	0	10–20	1–36
	Mid-open	3a	48	10–15	8–49
	Mid-closed	3b,c	36	10–15	8–49
	Mature-open	4a	1	15–20	#
	Mature-closed	4b,c	15	15–20	#
Warm-dry mixed conifer forest	Young	2	0	5–10	1–10
	Mid-open	3a	14	5–10	5–14
	Mid-closed	3b,c	24	5–10	5–14
	Mature-open	4a	7	35–45	#
	Mature-closed	4b,c	55	15–25	#
Ponderosa pine forest	Young	2	0	5–10	1–14
	Mid-open	3a	24	5–10	4–14
	Mid-closed	3b, c	36	5–10	4–14
	Mature-open	4a	11	40–60	#
	Mature-closed	4b,c	29	15–25	#
Aspen forest	Young	2	1	15–25	1–55
	Mid-open	3a	22	10–15	4–55
	Mid-closed	3b,c	62	15–20	4–55
	Mature-open	4a	1	25–30	35–86
	Mature-closed	4b,c	14	25–30	35–86
<sup>*</sup> 2, 3, and 4 refer to tree size (diameter at breast height): 2 = <1 inch dbh; 3 = 1 – 8.99 inches dbh; 4 = >9 inches dbh; a, b, and c refer to tree crown closure percent in a stand: a = < 40%; b = 40–70%; c = >70%. # = No data available The TRFO does not currently have old growth inventory data.					

## Objectives

- 2.2.45 Within 10 years, restore or improve soil productivity and soil carbon on at least 20 miles of road that will be closed or decommissioned on the SJNF and 5 miles of routes that will be closed or decommissioned on TRFO lands.
- 2.2.46 Within 10 years, increase the canopy cover of Arizona fescue by at least 10% in two Arizona fescue mountain grassland sites on the SJNF that currently classify as Kentucky bluegrass mountain grasslands by using mechanical treatments, prescribed fire, and/or seeding.
- 2.2.47 Within 10 years, inventory and map stand structure changes that have resulted from spruce beetle (*Dendroctonus rufipennis*) mortality and wildfire on both SJNF and TRFO lands.
- 2.2.48 Within 15 years, on suitable timber lands of the SJNF reforest 15% of spruce-fir forests that have extensive mortality of overstory spruce that do not have appropriate forest cover and will not reforest within 15 years.
- 2.2.49 Within 15 years, increase the young development stage of cool-moist mixed conifer forests on the SJNF from 0.5% to 15% by using prescribed fire and mechanical treatments (e.g., timber harvest) in the mature cool-moist mixed conifer forests.
- 2.2.50 Within 15 years, increase the young development stage of aspen forests on the SJNF to 25% by clear-cutting and/or conducting prescribed fire in mature aspen stands, and mixed conifer stands with an aspen component.
- 2.2.51 Over the next 15 years, manage 2,000 acres of high-elevation aspen stands on SJNF lands that are conifer-dominated or at risk of converting to conifer-dominated stands to maintain or increase aspen forests.
- 2.2.52 Within 15 years, increase the percent of ponderosa pine forests in the young development stage from 0% to 3% on SJNF and TRFO lands by using mechanical treatments (e.g., timber harvest) or fire (prescribed or natural ignitions).
- 2.2.53 Within 15 years, increase the percent of warm-dry mixed conifer forests in the young development stage from 0% to 3% on SJNF and TRFO lands by using mechanical treatments (e.g., timber harvest) or fire (prescribed or natural ignitions).
- 2.2.54 Within 15 years, improve the composition, structure, and function of 30,000 acres of ponderosa pine forests by using low-intensity fire (25,000 acres on the SJNF and 5,000 acres on TRFO lands).
- 2.2.55 Within 10 years, increase the cover of Arizona fescue by at least 20% within two ponderosa pine stands on the SJNF by using mechanical treatments, prescribed fire, and/or seeding.
- 2.2.56 Within 15 years, improve the abundance and distribution of perennial native bunchgrasses on 3,000 acres of semi-desert shrublands or semi-desert grasslands on TRFO lands.
- 2.2.57 Over the next 15 years, secure a reliable source of local seed stock for 16 or more native grass, forb, and shrub species (including Arizona fescue) to be used for revegetation and restoration after disturbance (eight species on the SJNF and eight species on TRFO lands).
- 2.2.58 Over the life of the LRMP, collect seed from 20 local vulnerable grass, forb, and shrub species, including some alpine species, for long-term storage to protect genetic sources (10 species on the SJNF and 10 species on TRFO lands).
- 2.2.59 Use locally produced biochar to sequester carbon, reduce erosion, and enhance soil productivity and water retention on a minimum of 1 acre per year (0.5 acre per year on the SJNF and 0.5 acre per year on TRFO lands) for five years.



- 2.2.60 After natural disturbance events or on restoration projects over the next 15 years, increase the variety of native non-commercial tree species and native shrubs used on a minimum of 100 acres (75 acres on the SJNF and 25 acres on TRFO lands).
- 2.2.61 Over the next 15 years, broaden tree seed collection activities on the SJNF to include non-commercial species and additional species specific elevation zones to improve genetic diversity and the resilience of forested ecosystems.
- 2.2.62 Over the next 15 years, revegetate and reclaim 10 acres using native early-successional plant species developed from local plant sources to accelerate restoration success (5 acres on SJNF and 5 acres on TRFO lands).
- 2.2.63 Over the next 20 years, enhance the resiliency of alpine ecosystems and provide refugia for alpine dependent species on 100 acres of TRFO lands through implementing recreation management plans, completing mine land reclamation, or conducting other management activities.
- 2.2.64 Over the next 20 years, enhance the resiliency of alpine ecosystems and provide refugia for alpine-dependent species by removing non-climate stressors that result in adverse impacts to alpine ecosystems (e.g., unmanaged livestock grazing, unmanaged motorized recreation) from 100 acres on SJNF lands that are forb-dominated alpine habitat.

## **Standards**

- 2.2.65 The construction of new permanent roads and utilities must not occur in protected areas in order to protect the ecological integrity of the terrestrial ecosystems within them, prevent ecosystem fragmentation, prevent the disruption of wildlife travel corridors, and prevent the establishment and spread of invasive plants.
- 2.2.66 Projects or activities in habitat occupied by federally listed plant species, or in designated critical habitat, must be designed and conducted in a manner that preserves the primary constituent elements needed to sustain the life history processes of those federally listed plant species.
- 2.2.67 Projects or activities occurring in fens, wetlands, or hanging gardens that are occupied by special status plant species must be designed to maintain the hydrologic systems necessary to support and sustain those species.
- 2.2.68 Projects or activities that occur in shale and gypsum soils that are occupied by special status plant species must be designed to maintain the soil characteristics necessary to support and sustain those species.

## **Guidelines**

- 2.2.69 Agency actions should not adversely affect the long-term soil productivity or carbon storage of terrestrial ecosystems.
- 2.2.70 Ground-disturbing management activities should not occur on lands that have a high potential for mass movement, including lands associated with SJNF and TRFO soil survey map units 254, 386, 606, 720, 926, 20511D, 30506D, 34301D, 34306D, 34506D, 50803D, 50806D, 70806D, 70807D, 74803D, 80604D, 80803D, and 80804D, or lands that display evidence of slope instability, unless site-specific field analysis indicates that mass movement is not likely to occur on those lands.
- 2.2.71 Projects or activities occurring in suitable habitat for federally listed plant species should be managed to minimize long-term impacts to the suitable habitat.

- 2.2.72 Agency actions should avoid or otherwise mitigate long-term adverse impacts in terrestrial ecosystems that have plant communities with G1 or G2 NatureServe Plant Community conservation status ranks in order to maintain the ecological integrity of those rare plant communities.
- 2.2.73 Agency actions should be designed to avoid or minimize impacts in canyon escarpments, unless the activity is designed to maintain or restore the composition, structure, or function of the terrestrial ecosystems within those escarpments.
- 2.2.74 Prior to any proposed agency actions on forested lands or woodlands, the affected stands should be screened against the current SJNF old growth database in order to determine their old growth status. Within landscapes not meeting desired conditions for old growth, ponderosa pine forest stands and mixed conifer forest stands that currently are not in the old growth development stage, but that contain significant old growth attributes should be prioritized as old growth recruitment areas, largely based on tree age and distribution across the SJNF, and managed for their old growth values.
- 2.2.75 Ground-disturbing projects on shale soils of the Mancos Shale, Lewis, Fruitland, and Morrison geologic formations, and other highly erosive soils, should be designed to include efforts that avoid or mitigate soil erosion or compaction (see Volume III, Appendix I).
- 2.2.76 Ground-disturbing activities in watersheds that are highly sensitive to anthropogenic disturbances, as identified in Volume III, Appendix I, should be designed to avoid or mitigate soil erosion or compaction.
- 2.2.77 Adequate slash (including tree tops and limbs), if deemed necessary for soil protection or nutrient cycling, should be left on-site following timber harvest and mechanical fuels treatments, and distributed as needed.
- 2.2.78 Wood chips produced by mastication treatments should be dispersed on the ground at a maximum depth of 3 inches over at least 80% of the covered area, and no chip piles should exceed 6 inches in depth.
- 2.2.79 Management activities in areas with biological soil crusts should be designed to minimize adverse impacts to the soil crusts.
- 2.2.80 Ground disturbance should be limited or otherwise mitigated on gypsum soils and organic soils (histosols) in order to protect the ecological integrity of these rare and unique soils and the rare plants associated with these soils.
- 2.2.81 Management activities should not decrease the abundance or distribution of southwestern white, limber, or bristlecone pine trees in order to maintain white pine species in SJNF forested environments.
- 2.2.82 Clearcuts in aspen forest stands that are 20 acres or greater should include wildlife leave tree groups of 0.5 to 5 acres in size on 10% to 15% of the clearcut. Where possible groups should have the following characteristics: live and/or dead large-diameter wood on the forest floor (greater than 15 inches diameter at breast height [dbh]), trees with evidence of cavities, broken or dead tops, or lightning strikes. Basal areas should exceed 100 square feet per acre.
- 2.2.83 Following timber harvest and mechanical fuels treatments, snags and large wood on the forest floor should meet the minimum standards described in Table 2.2.3 unless the stand did not contain these attributes before the activity, in which case treatments should be designed to help meet those standards in the future.

- 2.2.84 Certified, weed-free native seed mixes of local ecotypes should be used to revegetate terrestrial ecosystems where commercially available. Non-native, non-invasive plant material may be used in limited situations where considered necessary in order to protect resources and/or stabilize soils in a timely fashion. Persistent non-natives or invasive exotic plant species should be avoided.
- 2.2.85 If the desired conditions for the development stage of a terrestrial ecosystem type (see Tables 2.2.1 and 2.2.2) are underrepresented, management activities should be designed to move that development stage closer to the desired conditions, particularly in watersheds lacking the development stage.
- 2.2.86 Revegetation and reforestation plans or activities should consider the following strategies to maintain or improve resilience of forested and non-forested ecosystems:
- use a variety of species and phenotypes;
  - emphasize use of native species, collected locally;
  - use both commercial and non-commercial species for reforestation (non-commercial species include southwestern white, limber or bristlecone pine); and
  - use seed collected from across the range of climate zones.

**Table 2.2.3: Desired Conditions for Snags and Large Wood on San Juan National Forest and Tres Rios Field Office Lands**

Forest Type	Snags			Large Downed Wood	
	Minimum Diameter (dbh)	Number (per acre)	Minimum Height (feet)	Minimum Diameter (dbh)	Number (linear feet per acre)
Spruce-fir forests	15	3–5	25	15	200
	9*	5–10			
Cool-moist mixed conifer forests	15	2–3	25	15	150
	9*	5–10			
Aspen	9	5–10	25	9	150
Warm-dry mixed conifer forests	15	1–2	25	15	80
	9*	3–5			
Ponderosa pine forests	15 (12)	1	25 (15)**	15 (12)**	30
	9*	2–3			

Note: Quantities are based on an average per acre basis across treatment units. dbh = diameter at breast height.  
 \*If larger trees are not available, then the smaller minimum will apply and requires the greater number per acre range.  
 \*\*Numbers in parentheses apply to Dolores Ranger District and adjacent TRFO lands. Due to past harvest activity on the Dolores Ranger District and adjacent TRFO there is a lower abundance of larger snags available for habitat.

## Additional Guidance

- Executive Order (EO) 13112
- Plant Protection Act of 2000
- Cooperative Forestry Assistance Act of 1978
- Resource Conservation and Recovery Act of 1976
- Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA)
- Forest Service Handbook (FSH) 2509.13, Burned Area Rehabilitation Handbook
- FSH 2509.25, Watershed Conservation Practices Handbook

- FSH 2409.19, Renewable Resource Uses for Knutson-Vandenberg (K-V) Fund Handbook
- 1992 letter from USFS Region 2 Regional Forester to Forest Supervisors regarding regional old growth descriptions (USFS 1992b)
- FSH 2509.13, Burned Area Emergency Rehabilitation
- FSH 2509.25, Watershed Conservation Practices Handbook (Region 2 Supplement)
- FSM 2600, Wildlife, Fish, and Sensitive Plant Habitat Management
- BLM Manual 6840, Sensitive Species Management (2008)
- FSM 2550, Soil Management
- IM 2006-073: Weed-Free Seed Use on Lands Administered by the BLM (BLM 2006a)

## 2.3 Terrestrial Wildlife

### Introduction

Lands administered by the SJNF and TRFO have long served an important role in supporting a wide variety of wildlife species that are critical to the needs and values of the human population. Currently, the wildlife resource remains a cherished and important aspect to the people who live within and/or visit the planning area.

A wide variety of ecosystem types represent broad-scale habitat types on SJNF and TRFO lands. These ecosystems are described in detail in sections 2.2 and 2.4 of this LRMP and in corresponding sections in the FEIS. The soils, landforms, climate regimes, and major vegetation types associated with these ecosystems provide a diverse array of habitat conditions ranging from alpine tundra at the highest elevations to semi-desert shrublands and grasslands at the lowest elevations. Cliffs, caves, streams, waterfalls, and open water bodies also provide important wildlife habitat on the SJNF and TRFO. Based on species distribution maps for Colorado, over 300 wildlife species use the ecosystem diversity of SJNF and TRFO lands to meet their habitat needs (Fitzgerald et al. 1994; Hammerson 1999; Kingery 1998). Additional species may also pass through during migration and utilize habitats on or near the planning area for feeding or resting purposes.

Wildlife is a primary component of ecosystem function and an important part of the sustainable ecosystem strategy for SJNF and TRFO lands. They also provide substantial renewable economic values on which local communities depend. The categories and types of wildlife species on the SJNF and TRFO reflect the diversity of habitats available to them. Some species, such as mule deer (*Odocoileus hemionus*) and Rocky Mountain elk (*Cervus canadensis*), are steeped in the local culture and tradition and have long been important to the local people and communities. However, many non-game species are recognized for the economic, aesthetic, and ecological values they provide. Some of the wildlife species that occur on the SJNF and TRFO are migratory and/or wide-ranging and utilize several different habitat types while others are more sedentary and utilize only a single vegetation type or individual component within a vegetation type. All species contribute to or influence the ecological processes that maintain biodiversity on the SJNF and TRFO.

The LRMP provides guidance for project-level implementation to maintain or move the planning landscape toward desired conditions for wildlife habitat. Human population increases and better resource information are creating additional demands on wildlife resources that include increasing trends in recreation uses, extractive uses, and travel demands. The mix of multiple use management on the landscape can affect habitat effectiveness and wildlife populations in different ways. The LRMP guidance provides for multiple uses on the planning area that fall within the limits for maintaining the ecological integrity of ecosystems and protection of wildlife habitat.

Objectives for terrestrial wildlife and other resource programs will contribute to the maintenance of and/or improved wildlife habitat conditions (as described in Section 2.2). LRMP components described in other resource programs will also help the SJNF achieve terrestrial wildlife desired conditions (see Volume III, Appendix M). For example, the ponderosa pine restoration direction under the fuels section of the LRMP (see Section 2.11) is restoration of conditions to meet fuels objectives, but this direction will also be

designed to provide habitat characteristics (within the pine type) that benefit terrestrial wildlife. Benefits of these fuels objectives extend to a variety of wildlife species utilizing this habitat type. All objectives are subject to future funding and available resources.

Management of effective habitat provides, in part, for the maintenance of viable populations of existing native and desired non-native wildlife distributed throughout their current geographic range on SJNF lands, as well as sustainable populations across the TRFO. Other elements also support the ecological framework on which wildlife species depend. As discussed in Section 2.2, these ecosystems provide basic components, including soils, vegetation, climate, air, water, and physical character of the land, that support and provide for a diversity of terrestrial wildlife within this ecosystem matrix that are well distributed across the planning area.

Habitat assessments that include condition and trends on the SJNF have identified several major factors that have influenced change in forested and non-forested habitat conditions during the reference period. Factors include fire exclusion, timber harvesting, road and urban development, livestock grazing, and recreational uses associated with a rapidly growing human population. These conditions and trends have implications for wildlife species and populations that include:

- changes in forest structure and composition that may contribute to uncharacteristic wildfire behavior in lower-elevation forest types;
- disturbance from motorized use on roads and motorized trails;
- introduction and expansion of invasive plant species that reduces native plant diversity, wildlife habitat quality, connectivity, and reduces wildlife habitat effectiveness;
- reduction or degradation of habitats for some wildlife species where human impacts have occurred and/or where natural disturbance regimes have been altered;
- urban development and associated human disturbance in key seasonal wildlife use areas such as winter range and production areas; and
- rapidly increasing human populations and influences on the landscape that alter habitat security and contribute disturbance impacts to wildlife.

These impacts can alter habitat effectiveness and influence wildlife across the planning area. Habitats and their structural stages on SJNF lands have been monitored since the first SJNF Plan was signed in 1983, and trends have been established and recorded in habitat assessments for SJNF lands. In general, management has resulted in only relatively small changes to the vegetation condition across the SJNF since the inception of the 1983 SJNF Plan. Habitat types are well distributed across the landscape providing continuity and connectivity within and among important wildlife habitats. Trend analysis of major wildlife habitat types across the SJNF indicate that the maximum change for habitat type and structural stage has not varied by more than 5% on the landscape since the inception of the initial 1983 SJNF Plan. Most individual structural stages within each habitat type have not varied by more than 0% to 2% across the SJNF. These changes are attributed to both management actions and natural events such as wildfire. Habitat condition and plan components of the 1983 SJNF Plan have maintained sustainable wildlife populations across the planning area. Management of habitat in conjunction with the components in this LRMP is expected to continue to provide for population viability on NFS lands and maintain or move habitat conditions toward meeting desired conditions across the SJNF and TRFO.

The emphasis of the SJNF wildlife program is to provide ecological conditions to support all native and desired non-native terrestrial wildlife species over the life of the LRMP and contribute to the stability and recovery of special status species. To achieve these conditions a sustainable ecosystems strategy is used in this LRMP to provide a range of habitat conditions and provide the ecological framework for the conservation and management of ecosystems, habitats, and species occurring on SJNF and TRFO lands. The sustainable ecosystems strategy includes a four-pronged approach: 1) the designation and management of protected areas, 2) the application of ecosystem management using sustainable ecosystem concepts, 3) the development and application of the LRMP components (desired conditions, objectives, standards, and guidelines) that provide a framework for the management and preservation of ecosystems, and 4) the monitoring of effects of management activities on SJNF and TRFO lands with

application of adaptive management principles in response to monitoring results. This approach is expected to provide for viable populations on NFS lands and the diversity, sustainability, and maintenance of wildlife populations across the planning area. Each of these four applications is described in more detail below:

- **Designation and management of protected areas:** Protected areas are inclusive of large tracts of wildlife habitat types well distributed across the planning area. They will serve as conservation reserves and refuges to protect the native biodiversity within them and will provide wildlife movement corridors and linkage areas that connect landscapes and habitats, which facilitates the interaction of animals. Establishing and preserving protected areas within and between TRFO and SJNF lands is a means to maintain ecosystem diversity, which presumably will protect the diversity and sustainability of native plant and animal species and communities, and the ecological processes occurring within those ecosystems across the planning area, along with the viability of wildlife species on NFS lands. They cover approximately 11% of lands administered by the TRFO and include a variety of lower-elevation ecosystems. These tracts are capable of supporting sustaining populations of many wildlife species associated with these types. Approximately 54% of the SJNF lies within protected areas and includes much of the alpine and mid to upper montane wildlife habitat types. These tracts are capable of supporting sustaining populations of wildlife associated with these types.

Outside protected areas the land is subject to greater management emphasis in order to supply a wider diversity of goods and services under multiple use management. LRMP components are developed to assure management use of the land occurs in a sustainable manner that is not limiting to the ecosystem, including terrestrial wildlife species.

- **Application of ecosystem management using sustainable ecosystem concepts:** Ecosystem management is the integrating component of the sustainable ecosystems strategy. Ecosystem management on TRFO and SJNF lands, which uses the HRV for reference, will be implemented by maintaining or restoring the composition (plant species, animal species, and vegetation types), structure (size, density, and arrangement of live and dead vegetation, stream channel attributes), function (ecological processes and disturbances), and physical environment (soils, water, and geomorphology) of ecosystems. The approach is intended to protect and maintain these ecosystems and ensure the diversity, contribute to population viability on SJNF lands, and provide for sustainable wildlife populations across the planning area of the majority of species within them. Desired conditions, objectives, standards, and guidelines for management of terrestrial ecosystems are presented in Section 2.2.

When managing for viability on SJNF lands, and sustainability or diversity and maintenance of wildlife populations across SJNF and TRFO lands, it must be recognized that many population-level stressors are largely outside the control of the BLM and the USFS and many wildlife populations are landscape-level species that use a variety of habitats outside the planning area. The overall goal is to provide management of habitat on federal lands within the planning area that have all components needed for a species within various life stages. As most management activities occur on habitats outside protected areas, LRMP components are necessary to provide for and maintain ecosystem characteristics supporting populations on the matrix of actively managed lands. LRMP components have been developed to mitigate and/or minimize these influences on wildlife populations across the planning area.

- **Development and application of the LRMP components:** Wildlife species that may not be adequately recognized or protected by the above ecosystems management approach, or whose specific habitat needs or other life requirements may not be fully met under the sustainable ecosystems strategy, are given special management considerations below, including the development of LRMP components that contribute to

the conservation of those species. This approach may also be needed for special status species whose key habitat components are directly affected by agency management activities. Special status species on the SJNF and TRFO include federally listed species, species proposed for federal listing and proposed critical habitat, candidate species for federal listing, Region 2 Regional Forester's sensitive species, and Colorado BLM State Director's sensitive species. Some of these species have immediate needs that may not be adequately recognized and addressed by the overall sustainable ecosystems strategy. As such, they have been given special consideration and additional LRMP components below, developed to address those special needs. In addition, current species-specific conservation plans and strategies will be relied upon to address the needs of special status species. These plans and strategies are analogous to TNC's fine-filter approach, which is intended to protect species with known conservation concerns (Hunter et al. 1988; Noss 1987; TNC 1982). LRMP components specific to special status species augment those components developed through the ecosystem management approach. Species lists for the TRFO and SJNF are found in Volume III, Appendix P. Guidance for amphibians is included in Section 2.5, and guidance for migratory birds is found under the specific agency agreements with the U.S. Fish and Wildlife Service (USFWS) and listed within "Additional Guidance" at the end of this section.

Highlight species were also used as a planning tool in the development of the ecosystem management approach in this LRMP. Certain species representing a broad spectrum of conditions and needs across the planning area were selected in order to develop a strategy around those conditions and needs. Highlight species have no legal status, and no specific BLM or USFS policy or direction associated with them; they serve no further functionality past development of the ecosystem management approach and various LRMP components. LRMP components that provide direction for selected highlight species are summarized in Volume III, Appendix M.

- **Monitoring and adaptive management:** Effective monitoring and evaluation of how management activities on SJNF and TRFO lands are affecting ecosystems and wildlife, and the application of adaptive management principles, will be critical to maintaining functional, sustainable ecosystems and addressing the needs of dependent species. Refer to Chapter 4 below for a description of the wildlife monitoring requirements and the data sources and methodology that apply to wildlife population and habitat monitoring.

MIS are species monitored in order to assess the effects of management activities, related to specific management issues, on their populations and on the habitats with which they are associated. MIS is a USFS requirement and are not applicable to BLM lands. Monitored changes in MIS populations could indicate that current management is adversely affecting the composition structure, or function of associated habitats, affecting the management issue for which they were selected. This could result in indications that LRMP direction and desired conditions are not being met and indicate the need for adaptive management. Table 2.3.1 shows terrestrial wildlife MIS selected from the represented categories (see the ecosystem framework, Section 2.1), habitats of concern, and management issues addressed for the SJNF.

**Table 2.3.1: Terrestrial Wildlife Management Indicator Species on the San Juan National Forest**

Management Indicator Species	Habitat of Concern	Management Issue Addressed
Abert's squirrel ( <i>Sciurus aberti</i> )	Ponderosa pine forests	Effects to species and habitat associated with timber harvest and fuels treatments
American marten ( <i>Martes americana</i> )	Spruce-fir and cool-moist mixed conifer forests	Effects to species and habitat associated with recreation and timber harvest
Hairy woodpecker ( <i>Picoides villosus</i> )	Ponderosa pine, aspen, and mixed conifer forests	Effects to species and habitat associated with timber harvest and fuels treatments
Elk ( <i>Cervus elaphus</i> )	Severe winter range and winter concentration areas (pinyon-juniper woodlands, sagebrush shrublands, mountain shrublands, and ponderosa pine forests)	Effects to species and habitat associated with recreation, fuels treatments, oil and gas development, and timber harvest

LRMP components are also directly linked to providing for management of habitat to address population viability on NFS lands. Identified ecosystem elements that contribute to viability, such as physical habitat, biological factors, human factors, and species-specific factors are listed in Volume III, Appendix Q. As described in Section 2.1, management direction has been developed that is intended to address the legal, regulatory, and policy requirements for species diversity and population viability (USFS lands) for terrestrial wildlife species, including associated special status wildlife species. The desired future conditions, management objectives, and standards and guidelines listed below for wildlife and special status species, as well as the other identified LRMP components, support those elements found to be most critical to the maintenance of species diversity and population viability on SJNF lands.

LRMP implementation will involve close coordination with the CPW and the USFWS. In particular, the SJNF and TRFO consider these agencies to be the best source of population data for distribution and range maps and will coordinate closely with them to keep habitat data current during plan implementation. Partnerships with other state and federal agencies, as well as with tribal governments and other interested organizations and individuals, will help the SJNF and TRFO better manage for wildlife habitats and populations. These cooperative efforts will serve as an important way to achieve desired conditions and to accomplish multiple-use plan objectives.

## Desired Conditions

- 2.3.1 Wildlife populations are viable on SJNF lands. Wildlife populations are self-sustaining, connected, and genetically diverse across SJNF and TRFO lands.
- 2.3.2 Big game severe winter range, winter concentration areas, and production areas are capable of supporting populations that meet state population objectives. These areas provide sustainable forage and habitat in areas with acceptable levels of human disturbance which do not reduce habitat effectiveness.
- 2.3.3 Invasive exotic wildlife species and diseases do not become established within the planning area. Existing invasive exotic wildlife species and diseases do not spread.
- 2.3.4 Habitat components (e.g., snags and downed logs) are maintained. Unique habitat types (e.g., springs, seeps, willow carrs, caves, and cliffs) support associated flora and fauna (with abundance and distribution commensurate with the capability of the land).
- 2.3.5 Large predator species contribute to ecological diversity and ecosystem functioning.
- 2.3.6 Projects and activities occurring on USFS and BLM lands near state and federal highways are designed to provide for long-term connectivity and integrity of habitats to facilitate effective wildlife movement.



- 2.3.7 Snag and downed wood features occur in quantities that support self-sustaining populations of associated species.
- 2.3.8 Effective raptor nesting habitat occurs throughout the planning area with abundance and distribution commensurate with the capability of the land to sustain populations.
- 2.3.9 Ecosystems and habitat conditions for terrestrial wildlife species sensitive to human disturbance are maintained.
- 2.3.10 Vegetation openings created through management actions preserve the natural patchiness inherent in Southern Rocky Mountain ecosystems.
- 2.3.11 Habitat continuity and travel corridors exist and persist to facilitate species movement and establishment into newly suitable areas as a result of changing habitats.
- 2.3.12 Populations are conserved by maintaining or improving habitat availability and quality through the incorporation of conservation strategies and species' habitat needs during project development and implementation.
- 2.3.13 Riparian and aquatic habitat, including springs and fens, support well-distributed populations of invertebrate and vertebrate riparian and aquatic dependent wildlife special status species.
- 2.3.14 Disturbances from management activities occur at levels that support critical life functions and sustain key habitat characteristics for wildlife special status species.
- 2.3.15 Areas identified as critical habitat or proposed critical habitat for special status wildlife species have the characteristics to support sustainable populations, promoting recovery of the species.
- 2.3.16 The alpine and subalpine willow (*Salix* sp.) dominated riparian areas, providing crucial winter habitat for white-tailed ptarmigan (*Lagopus leucura*) and snowshoe hare (*Lepus americanus*), do not bioaccumulate heavy metals above historically occurring background levels which enter the food chain. Areas of contamination do not become limiting factors for wildlife population sustainability.
- 2.3.17 Management actions maintain or improve habitat conditions for special status species, contributing to the stability and/or recovery of these species.
- 2.3.18 Special status species are able to disperse within the planning area and into adjacent lands. This will allow for the interchange between populations and the maintenance of genetic diversity.
- 2.3.19 MIS are able to disperse freely across the planning area allowing for the interchange between populations and the maintenance of genetic diversity (SJNF only).
- 2.3.20 **MIS:** Abert's squirrel (*Sciurus aberti*) - Ponderosa pine habitats provide interconnected structure in mature conifer stands that produce abundant foraging (cone crops and above- and belowground fungi) and reproductive habitat (SJNF only).
- 2.3.21 **MIS:** American marten (*Martes americana*) - Habitat connectivity for spruce-fir and cool-moist mixed conifer forests is maintained at broad spatial scales. These forests contain a diverse array of structural stages (including mature and old growth) and habitat attributes (snags and downed logs) to provide effective foraging, breeding and dispersal habitat for marten (SJNF only).
- 2.3.22 **MIS: Elk** - Management activities and human disturbance levels (especially in severe winter range, winter concentration areas, and calving grounds) provide effective habitat capable of meeting state population objectives (SJNF only).

- 2.3.23 **MIS: Hairy Woodpecker (*Picoides villosus*)** - Snags occur in numbers, size, and quality in and adjacent to aspen, ponderosa pine, and mixed conifer forests to provide effective habitat for foraging and reproduction (SJNF only).

## Objectives

- 2.3.24 Treat 2,000 or more acres of vegetation on TRFO lands and 2,000 or more acres of vegetation on SJNF lands over the life of the LRMP to improve habitat that supports sustainable populations of terrestrial wildlife across the planning area.
- 2.3.25 Conduct a minimum of six wildlife interpretive and environmental education programs to inform the public on natural resource management, wildlife species, and their habitats, and encourage youth participation and interest in wildlife and natural resources (SJNF only).
- 2.3.26 **Gunnison Sage-grouse (*Centrocercus minimus*)**: improve habitat for Gunnison sage-grouse when conducting resource management actions within occupied habitat.
- 2.3.27 **Nokomis Fritillary Butterfly (*Speyeria nokomis*)**: Over the life of the LRMP, restore the hydrologic conditions and plant communities during project implementation at springs or seeps capable of supporting Nokomis fritillary while, at the same time, retaining the water development for livestock or other uses.
- 2.3.28 **Bats**: Over the life of the LRMP, all mine closures for human safety at sites supporting bat populations include structures (such as bat gates) designed to provide for continued use as bat habitat.
- 2.3.29 **Inventory and Monitoring**: Improve knowledge on the distribution of wildlife special status species and their habitats by inventorying habitat and species as identified in the LRMP monitoring section over the life of the LRMP. Work with conservation partners in the study, management, and monitoring of these species.
- 2.3.30 **Invasives and Disease**: Over the life of the LRMP, coordinate with CPW to prevent introductions or spread of fish or terrestrial wildlife species, as needed, where there is potential for negative impacts on wildlife special status species.
- 2.3.31 **MIS (SJNF only): Abert's squirrel** - Over the life of the LRMP, restore approximately 3,000 acres of ponderosa pine forest to improve habitat quality as defined in the *Abert's Squirrel Species Assessment San Juan National Forest* (USFS 2004a, 2003).
- 2.3.32 **MIS (SJNF only): American marten** - Over the life of the LRMP, treat approximately 2,000 acres of spruce-fir and cool-moist mixed conifer forests to increase age class diversity and provide future foraging, breeding and dispersal habitat as defined in the *American Marten Species Assessment San Juan National Forest* (USFS 2004b).
- 2.3.33 **MIS (SJNF only): Elk** - Over the life of the LRMP, improve approximately 5,000 acres of winter range through mechanical and prescribed burn treatments as defined in the *American Elk Species Assessment San Juan National Forest* (USFS 2004c).
- 2.3.34 **MIS (SJNF only): Hairy Woodpecker** - Over the life of the LRMP, harvest and regenerate approximately 3,000 acres of aspen forest to increase age class diversity and provide future mature aspen nesting habitat as defined in the *Hairy Woodpecker Species Assessment San Juan National Forest* (USFS 2004d).

## Standards

- 2.3.35 Standards for the golden eagle (*Aquila chrysaetos*), bald eagle (*Haliaeetus leucocephalus*), and peregrine falcon (*Falco peregrinus*) are listed in Table 2.3.2.

- 2.3.36 **Predator Control:** On SJNF lands within the planning area, predator control must be managed in cooperation with the state wildlife agencies, the USFWS, Animal Plant Health Inspection Services (APHIS) and other appropriate agencies and cooperators in order to reduce damage to other resources (and to direct control toward removing only the offending animal). Preventive methods of denning, aerial gunning, and poisons of any kind towards predators must not be allowed on SJNF lands within the planning area under any circumstances.
- 2.3.37 **Bats:** If abandoned mines are closed, surveys will be conducted to determine occupancy. If surveys cannot be completed, occupancy will be assumed and mine closures must allow for bat access. Abandon mines that are determined to be hazardous to bats will be closed to bats.
- 2.3.38 **Bats:** Human access at occupied caves or abandoned mines will be restricted as necessary during the following periods to maintain essential life cycle processes:
- Maternity sites - April 15 through September 1
  - Swarming sites - August 15 through October 15 (30 minutes before sunset to 30 minutes after sunrise)
  - Winter hibernacula - October 15 through May 15
- 2.3.39 **Bighorn Sheep (*Ovis canadensis*):** During project-level planning on domestic sheep (*O. aries*) allotments, management options must be developed to prevent physical contact between domestic sheep and bighorn sheep. Actions may include but are not limited to boundary modification, livestock-type conversion, or allotment closures.
- 2.3.40 **Bighorn Sheep:** Grazing permit administration in occupied bighorn sheep habitat must utilize measures to prevent physical contact between domestic sheep and bighorn sheep. Permit administration actions may include but are not limited to use of guard dogs, grazing rotation adjustments, or relocation of salting and bed grounds.
- 2.3.41 **Bighorn Sheep:** Management of recreational pack goats and other domestic goats (*Capra aegagrus hircus*) must utilize measures to prevent physical contact with bighorn sheep.
- 2.3.42 **Bighorn Sheep:** Domestic goats used for invasive plant control must be veterinarian certified as free of pathogens transmissible to bighorn sheep, except in areas where there is no risk of contact with bighorn sheep.
- 2.3.43 **Butterflies:** Management actions that could adversely impact occupied habitat used by special status butterfly species for reproduction must be designed to sustain host plant species.
- 2.3.44 **Columbian Sharp-tailed Grouse (*Tympanuchus phasianellus columbianus*):** New noise sources resulting from management activities must not contribute to noise levels that negatively impact sharp-tailed grouse leks during the active lek season (March 1 to June 30) based on best available science
- 2.3.45 **Gunnison Sage-grouse:** Management activities must not occur from March 1 to June 30 within occupied habitat suitable for nesting to allow for breeding and December 1 to March 15 for known winter habitat.
- 2.3.46 **Gunnison Sage-grouse:** New structural improvements or surface disturbance must not occur within known winter concentration area or within a 0.6-mile radius of known Gunnison sage-grouse leks.
- 2.3.47 **Gunnison Sage-grouse:** In occupied habitat fuels treatments must be designed and implemented with an emphasis on protecting and enhancing existing sagebrush ecosystems
- 2.3.48 **Gunnison Sage-grouse:** Invasive vegetation must be monitored and controlled post-treatment.

## Guidelines

- 2.3.49 Guidelines for the golden eagle, bald eagle, osprey (*Pandion haliaetus*), peregrine falcon, northern goshawk (*Accipiter gentilis*), burrowing owl (*Athene cunicularia*), and all other accipiter, buteo, falcon, harrier, and owl species are listed in Table 2.3.2.
- 2.3.50 In order to determine site occupation, pre-implementation surveys may be required for projects occurring in habitats that may support populations of sensitive species and species listed or proposed under the ESA, as determined by an agency biologist.
- 2.3.51 **Bats:** Human access should be managed at caves and abandoned mines where known bat populations exist to protect bat habitat from disturbance and/or the introduction of pathogens. Management examples include, but are not limited to, seasonal or permanent closures and excluding humans by installing bat gates.
- 2.3.52 **Bats:** Where known bat concentrations of significant conservation concern are located outside caves or abandoned mines (such as in bridges structures, rock crevasse, or tree snags), human disturbance should be managed in order to protect those populations and the concentration site's physical features.
- 2.3.53 **Bats:** On the SJNF, formal mineral withdrawal of abandoned mines for conservation of special status bat species should be pursued when demonstrated necessary to prevent loss of effective or crucial habitat due to mining activity.
- 2.3.54 **Bats:** At swarming sites, hibernacula, and maternity sites, activities that may alter the suitability of the cave or abandoned mine for bat occupation should not occur within 500 feet of the entrance, unless to rehabilitate the suitability of the site or install mine safety closures.
- 2.3.55 **Migratory Birds:** Projects or activities should consider and undertake proactive bird conservation actions as practicable particularly during breeding season to maintain or improve habitat needs over the long-term for species identified by each agency as priority for conservation action.
- 2.3.56 The drainage of acid-mine runoff through alpine and subalpine willow-dominated riparian areas that provide crucial winter habitat for white-tailed ptarmigan and snowshoe hare should be avoided in order to prevent physiological impacts from the effects of bioaccumulation of heavy metals.
- 2.3.57 **Pollinators:** Pollinators should be considered during the application of pesticides to prevent population-level impacts and maintain pollinator function in the ecosystem.
- 2.3.58 New structural improvements, reconstruction, and operations should be designed to provide for wildlife movement to sustain populations.
- 2.3.59 Projects or activities that adversely impact pronghorn (*Antilocapra americana*) and elk production areas should be limited or avoided. This will keep reproductive success from being negatively impacted from management activities by using access restrictions during the following periods:
- Pronghorn: May 1–July 1
  - Elk: May 15–June 30
- 2.3.60 Management activities and access should be limited or avoided in critical winter range, severe winter range, and winter concentration areas for pronghorn, elk, and mule deer during the following times to keep survival and reproduction from being negatively impacted (see Figures 2.3.1, 2.3.2, and 2.3.5):
- Pronghorn: December 1–April 30
  - Elk: December 1–April 30
  - Mule deer: December 1–April 30

- 2.3.61 Severe and critical big game winter range and winter concentration areas: In Animas City Mountain and Grandview Ridge, conditions-based winter wildlife closures should be implemented in order to protect critical and severe winter range and winter concentrations areas for elk and mule deer. This includes Animas and Grandview recreation areas. These closures may be implemented at any time between December 1 and April 30. The closures should be based on existing snow conditions and/or the level of wildlife use for the given area. The specific conditions that will trigger a closure or that will allow the BLM to open the Cortez or Durango Special Recreation Management Areas (SRMA) will be based on snow conditions of 16 inches. Parameters for re-opening will be based on 1) general assessment of the north facing slope, such as absence of snow; 2) weather/snow condition in the general surrounding area; 3) presence of big game at higher elevations; and 4) coordination with CPW.
- 2.3.62 **Ungulates:** Projects or activities in big game critical winter range, winter concentration areas, severe winter range, production areas, and important migration corridors should be designed and conducted in a manner that preserves and does not reduce habitat effectiveness within those mapped areas.
- 2.3.63 **Ungulates:** In order to provide for healthy ungulate populations capable of meeting state population objectives, anthropomorphic activity and improvements across the planning area should be designed to maintain and continue to provide effective habitat components that support critical life functions. This includes components of size and quality on the landscape providing connectivity to seasonal habitats (wildlife travel corridors), production areas, critical winter range, severe winter range, and winter concentration areas, along with other habitat components necessary to support herd viability.
- 2.3.64 **Bighorn Sheep:** Projects or activities that adversely impact bighorn sheep production areas by reducing habitat effectiveness should be limited or avoided, using access restrictions during the following periods (see Figure 2.3.3):
- Rocky Mountain bighorn sheep (*Ovis canadensis canadensis*): April 15–June 30
  - Desert bighorn sheep (*O.c. nelsoni*): February 1–May 1
- 2.3.65 **Bighorn Sheep:** Projects or activities that adversely impact bighorn sheep severe winter range and winter concentration areas by reducing habitat effectiveness should be limited or avoided using access restrictions during the following periods:
- Rocky Mountain bighorn sheep: November 1–April 15
  - Desert bighorn sheep: December 1–April 15
- 2.3.66 **Wildlife Corridors:** Public ownership of important wildlife movement corridors should be maintained. Priority areas are those adjacent to public highways or where public lands are identified as a key component in maintaining the integrity of seasonal movements by wildlife in an otherwise restricted landscape.
- 2.3.67 **Columbian Sharp-tailed Grouse:** Surveys for new/unknown Columbian sharp-tailed grouse leks within occupied Columbian sharp-tailed grouse habitat should be completed prior to project approval in order to determine if additional management actions to provide for habitat effectiveness are necessary.
- 2.3.68 **Columbian Sharp-tailed Grouse:** Management activities that adversely impact critical life functions should not occur from March 15 to July 30 within a 1.25-mile radius of mapped occupied Columbian sharp-tailed grouse leks to allow for breeding and December 1 to March 15 for known winter habitat to provide for effective winter habitat to support populations on the landscape.
- 2.3.69 **Columbian Sharp-tailed Grouse:** No new structural improvements or surface disturbance should occur within known winter habitat or within a 0.4-mile radius of known Columbian sharp-tailed grouse leks to maintain effective habitat for critical life functions.

### ***Gunnison Sage-grouse***

- 2.3.70 Structures in sage-grouse habitat should be constructed to limit risk of collision and predation
- 2.3.71 New noise sources resulting from management activities should not contribute to noise levels that negatively impact sage-grouse leks during the active lek season (March 1 to June 30) based on best available science.
- 2.3.72 Projects in occupied Gunnison sage-grouse habitat should be designed to mitigate or avoid the direct or indirect loss of habitat necessary for maintenance of the local population or reduce to acceptable levels the direct or indirect loss of important habitat necessary for sustainable local populations. Projects will incorporate special reclamation measures or design features that accelerate recovery and/or re-establishment of affected sage-grouse habitat as much as possible.
- 2.3.73 Applicable BMPs should be applied to all mineral proposals as Conditions of Approval within occupied sage-grouse habitat to provide for adequate effective habitat and breeding, nesting, and wintering habitat.
- 2.3.74 Remote methodologies for monitoring, transporting fluids to centralized collection tanks, etc., should be utilized to minimize human disturbance in Gunnison sage-grouse habitat.
- 2.3.75 Fuels treatments should be designed to meet strategic protection of identified occupied sage-grouse habitat.
- 2.3.76 Use of native seeds should be used for revegetation following fuels management treatment based on availability, adaptation (site potential), and probability of success (Richards et al. 1998). Where probability of success or native seed availability is low, non-native seeds may be used as long as they meet sage-grouse habitat objectives
- 2.3.77 Within occupied Gunnison sage-grouse critical habitat the RCP grazing guidelines should be incorporated when appropriate.
- 2.3.78 Within occupied habitat, grazing in treatment areas should be deferred for 2 growing season after treatment, unless needed for seedbed preparation or desired understory and overstory are established.
- 2.3.79 When developing or modifying water developments, BMPs (see Volume III, Appendix N) should be used to mitigate potential impacts from West Nile virus on sage-grouse within occupied habitat.

**Table 2.3.2: Raptor Timing and Buffer Zone Distance Standards and Guidelines**

Species	Impact/Risk	Time Frame	Buffer Distance <sup>****</sup>	Source
Golden eagle	Structural improvements <sup>*</sup>	Year-round	New structures must not occur within a 0.5-mile radius of an active nest. (S) <sup>***</sup>	CPW 2008
	Disturbance <sup>**</sup>	December 15–July 15	Human encroachment should not occur within 0.5 mile of an active nest during the nesting season. (G) <sup>***</sup>	CPW 2008
Bald eagle	Structural improvements <sup>*</sup>	Year round	New structures must not occur within a 0.5-mile radius of an active nest. (S) <sup>***</sup>	SJNF and TRFO
	Disturbance <sup>**</sup>	November 15–July 15	Human encroachment should not occur within 0.5 mile of an active nest during the nesting season. (G) <sup>***</sup>	SJNF and TRFO

Species	Impact/Risk	Time Frame	Buffer Distance****	Source
Bald eagle winter roost	Structural improvements*	Year round	New structures must not occur within 0.5 mile of a communal roost site. (S)	SJNF and TRFO
	Disturbance**	November 15–March 15	Human encroachment should not occur within a 0.25-mile radius (indirect line of sight) or a 0.5-mile radius (direct line of sight) of a communal winter roost site (as identified by CPW and the managing agency biologist). (G)  Limit activity between 10 a.m. and 2 p.m. if encroachment will occur within buffer zones. (G)	CPW 2008
Osprey	Disturbance**	April 1–August 31	Human encroachment should not occur within 0.25 mile of a nest during the nesting season. (G)	SJNF and TRFO
	Structural Improvements*	Year-round	New structures should not occur within a 0.25-mile radius of an active nest. (G)	CPW 2008
Peregrine falcon	Structural Improvements*	Year-round	New structures must not occur within a 0.5-mile radius of an active cliff nest complex. (S)	CPW 2008
	Disturbance**	March 15–July 31	Human encroachment should not occur within 0.5 mile of a nest during the nesting season. (G)	CPW 2008
Northern goshawk	Disturbance**	March 1–August 31	Human encroachment should not occur within 0.5 mile of a nest during the nesting season. (G)	SJNF and TRFO
	Structural Improvements*	Year-round	New structures should not occur within a 0.5-mile radius of an active nest. (G)	CPW 2008
Burrowing owl	Disturbance**	March 15–August 15	Human encroachment should not occur within 0.25 mile of nest burrows when owls may be present during the nesting season. (G)	Romin and Muck 2002
	Structural Improvements*	Year-round	New structures should not occur within a 0.25-mile radius of active nests or within occupied habitat. (G)	Romin and Muck 2002
All other raptors	Disturbance**	Varies by species	Determination of the application of these specific seasonal restrictions, timing limitations, and/or buffer distances should be made by the project biologist, guided by agency requirements, along with professional knowledge and experience. They will be considered on a case-by-case basis, taking into consideration site-specific factors such as topography, vegetation, species of raptor, historic patterns of human activity and infrastructure, and observed behaviors of individual birds. (G)	Romin and Muck 2002

Species	Impact/Risk	Time Frame	Buffer Distance****	Source
	Structural Improvements*	Varies by species	Determination of the application of these specific seasonal restrictions, timing limitations, and/or buffer distances should be made by the project biologist, guided by agency requirements, along with professional knowledge and experience. They will be considered on a case-by-case basis, taking into consideration site-specific factors such as topography, vegetation, species of raptor, historic patterns of human activity and infrastructure, and observed behaviors of individual birds. (G)	Romin and Muck 2002
<p>*Structures include improvements such as roads, trails, radio towers, power lines, aboveground transmission corridors, and wells as proposed following nest establishment. This is not intended to include structures that historically occurred in the area prior to nest establishment.</p> <p>**This does not apply to historic levels and patterns of disturbance under which the nest was established and is intended to apply to additional levels and change in disturbance patterns.</p> <p>***Golden and bald eagle nest as defined under the Bald and Golden Eagle Protection Act.</p> <p>****Buffer distances for some species may vary based on site-specific information, current science, and agency wildlife biologists' professional judgment. Area closures may be considered where appropriate.</p> <p>Note: (S) = Standard; (G) = Guideline.</p> <p>Table information is based on a variety of sources, including 2008 Colorado Parks and Wildlife raptor guidelines, Romin and Muck (2002), professional knowledge of local area conditions, Reynolds et al.'s (1992) recommendations specific to the SJNF, and Bald and Golden Eagle Protection Act conformance</p> <p>Where literature and other evidence shows, exceptions may occur when individuals are adapted to human activity. Management is designed to reduce impacts during sensitive periods.</p>				

## Additional Guidance

### Terrestrial Wildlife

- ESA
- FSM 2600, Wildlife, Fish and Sensitive Plant Habitat Management
- FSH 2609-13, Wildlife and Fisheries Program Management
- FSM 2550, Soil Management
- FSM 5150, Fuel Management
- FSH 2509-18, Soil Management
- FSH 2509-25, Watershed Conservation Practices Handbook (Region 2 Supplement)
- Colorado's Comprehensive Wildlife Conservation Strategy (Colorado Division of Wildlife 2006) (see Volume III, Appendix H for details on wildlife guidance in relation to leasable minerals)
- Managing Forested Lands for Wildlife (Hoover and Wills 1984)

### Special Status Species

- FSM 2600, Wildlife, Fish, and Sensitive Plant Habitat Management
- Colorado's Comprehensive Wildlife Conservation Strategy (2005)
- A Process for Finding Management Solutions to the Incompatibility Between Domestic and Bighorn Sheep (Schommer and Woolever 2001)
- Colorado Desert Bighorn Sheep Management Plan (CPW and BLM 1989)
- Colorado Bighorn Sheep Management Plan 2009-2019 (George et al. 2009)
- Recommendations for Domestic Sheep and Goat Management in Wild Sheep Habitat (Wild Sheep Working Group, Western Association of Fish and Wildlife Agencies 2012)



- BLM Manual 6840, Special Status Species Management (as revised, December 2008)
- San Juan National Forest Plan Amendment #15 and associated Decision Notice for animal damage control (USFS 1992c)

#### Bats

- Federal Cave Resources Protection Act of 1988
- Colorado Bat Conservation Plan (Ellison et al. 2003)
- Townsend's Big-eared Bat (*Corynorhinus townsendii*): A Technical Conservation Assessment (Gruver et al. 2006)
- The Fringed Myotis: A Technical Conservation Assessment (Keinath 2004)

#### Migratory Birds

- The Migratory Bird Treaty Act of 1918
- The Migratory Bird Conservation Act of 1929
- the Neotropical Migratory Bird Conservation Act of 2000
- EO 13186, 2001
- USFWS Birds of Conservation Concern (2002a)
- Colorado Partners in Flight Land Bird Conservation Plan (2000)
- Partners In Flight North American Landbird Conservation Plan (Rich et al. 2004)
- U.S. Shorebird Conservation Plan (2nd ed.) (USFWS 2001a)
- Waterbird Conservation Plan for the Americas: The North American Waterbird Conservation Plan (Version 1) (Kushlan et al. 2002)
- Flammulated, Boreal, and Great Gray Owls in the United States: A Technical Conservation Assessment (Hayward and Verner 1994)
- USFS and USFWS MOU to Promote the Conservation of Migratory Birds, Agreement # 08-MU-1113-2400-246 (USFS and USFWS 2008)
- BLM Instruction Memorandum (IM) No. CO-2011-07 Migratory Bird Treaty Act – Interim Management Guidance (expires September 30, 2012) (BLM 2011a)

#### Threatened and Endangered Species

- Final Southwestern Willow Flycatcher Recovery Plan (USFWS 2002b)
- Mexican Spotted Owl Recovery Plan (USFWS 2012a)
- Uncompahgre Fritillary Butterfly Recovery Plan (USFWS 1994)
- Annual Uncompahgre fritillary butterfly monitoring and inventory field report and status updates (USFWS 2013a)
- Final Designation of Critical Habitat for the Mexican Spotted Owl: Final Rule (USFWS 2004)
- Canada lynx conservation agreement (USFS and USFWS (2000)
- Lynx Conservation Assessment and Strategy (Ruediger et al. 2000)
- Southern Rockies Lynx Amendment (USFS 2008)
- October 23, 2012, letter regarding guidance on Section 7 consultation procedures for the southwestern willow flycatcher, USFWS concurrence to the SJNF, December 12, 2012 (USFWS 2012b)
- Southwestern willow flycatcher guidance letter from USFWS to TRFO (USFWS 2012c)

#### Butterflies and Pollinators

- USFS and North American Butterfly Association MOU, USFS Agreement # 08-SU-1113-241-298 (2008)
- BLM and the Coevolution Institute MOU WO-230-2007-005 (2007)
- USFS and the Xerces Society, USFS Agreement No 09-SU-11130121-091 (2009)

#### Predator Control

- BLM IM No. CO-2000, Animal Damage Control Activities (BLM 2000)
- Master MOU between the BLM and APHIS Wildlife Service (1995)
- Colorado State level MOU between the Colorado Department of Natural Resources, the CPW, the BLM, the USFS, the Contractors State License Board (CSLB), and the APHIS Wildlife Service (1999)
- San Juan National Forest Plan Amendment #15, and associated Decision Notice for Animal Damage Control (USFS 1992c)
- Master MOU between the USFS and the APHIS Wildlife Service (1998)

#### Raptors

- Bald and Golden Eagle Protection Act of 1940
- Recommended Buffer Zones and Seasonal Restrictions for Colorado Raptors (CPW 2008)
- Reducing Avian Collisions with Power Lines: State of the Art in 2012 (Edison Electric Institute and Avian Power Line Interaction Committee)

#### Gunnison Sage-grouse

- Conservation Plan Agreement to participate in the LRMP, signed by the Region 2 Regional Forester (April 28, 2005) and the BLM State Director (April 29, 2005), IM No. CO-2010-28 provides direction for sage-grouse (USFS and BLM 2005)
- Gunnison Sage-grouse Rangewide Conservation Plan (Gunnison Sage-grouse Rangewide Steering Committee 2005)
- A Report on National Greater Sage-Grouse, Conservation Measures, produced by the Sage-grouse National Technical Team (December 21, 2011) (BLM 2011b)

#### Ungulates

- FSM 2600, Wildlife, Fish, and Sensitive Plant Habitat Management
- FSH 2609.13, Wildlife and Fisheries Program Management Handbook
- Managing Forested Lands for Wildlife (Hoover and Wills 1984)
- Hermosa Deer Management Plan: Data Analysis Unit D-52 (CPW 2001a)
- San Juan Deer Management Plan: Data Analysis Unit D-30 (CPW 2001b)

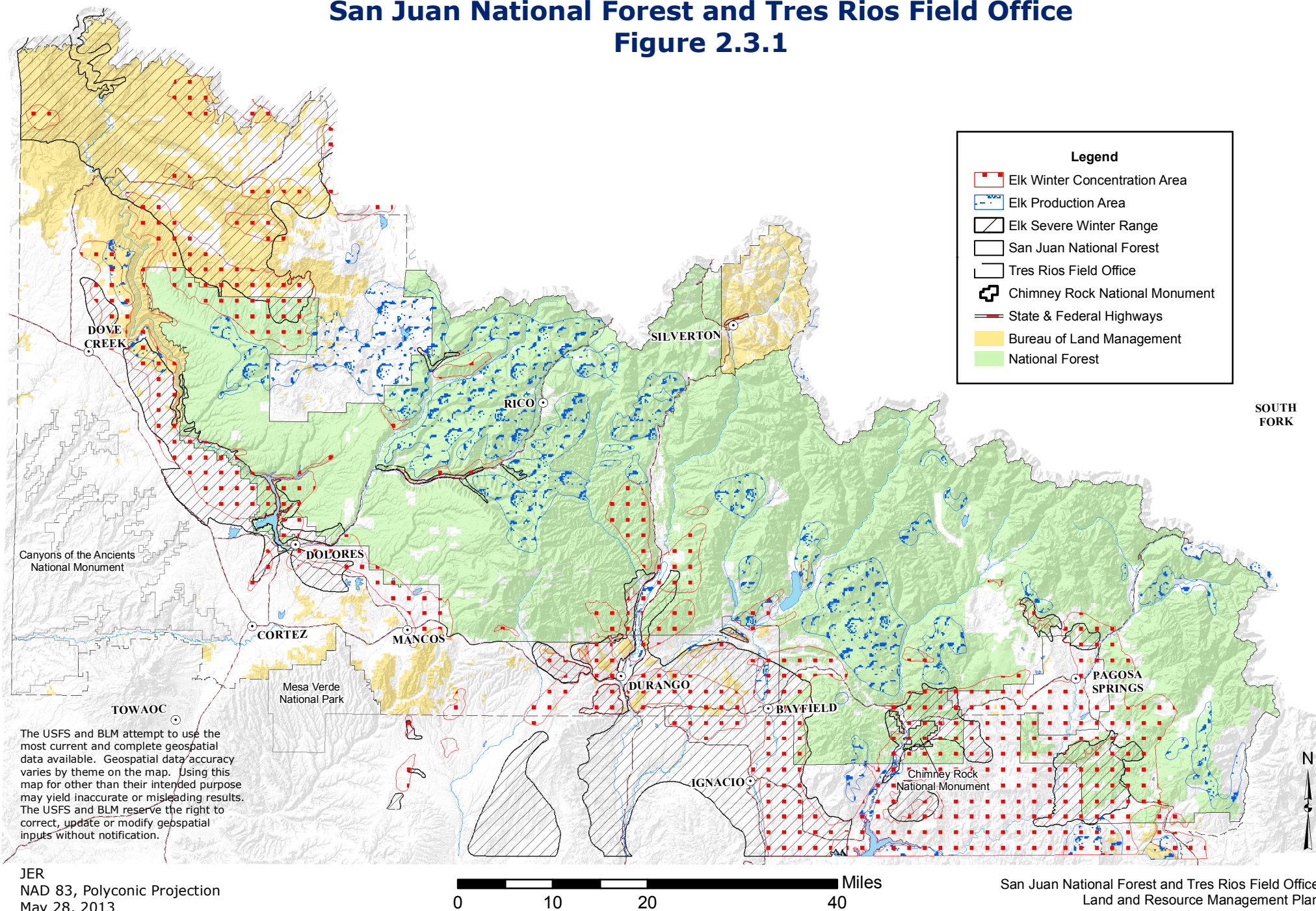
#### Wildlife Corridors

- Linking Colorado's Landscapes, Phase II Reports (Southern Rockies Ecosystem Project 2006)
- Lynx Linkages Areas discussed in the USFS 2001 Programmatic Consultation Agreement for Canada Lynx in Colorado (USFS 2001a)

# Elk Severe Winter Range, Winter Concentration Areas and Production Areas

San Juan National Forest and Tres Rios Field Office

Figure 2.3.1

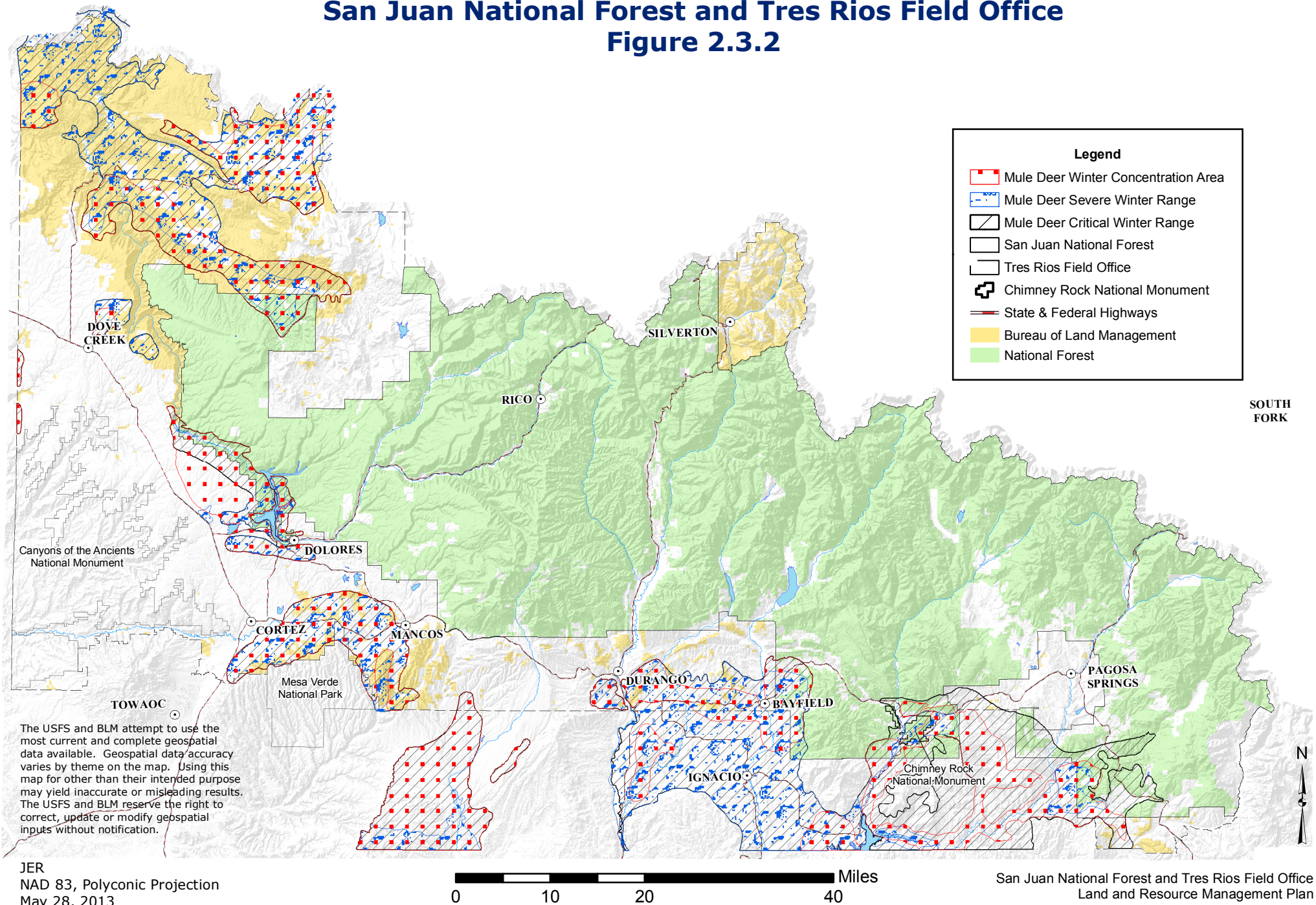




# Mule Deer Severe Winter Range, Winter Concentration Areas and Production Areas

San Juan National Forest and Tres Rios Field Office

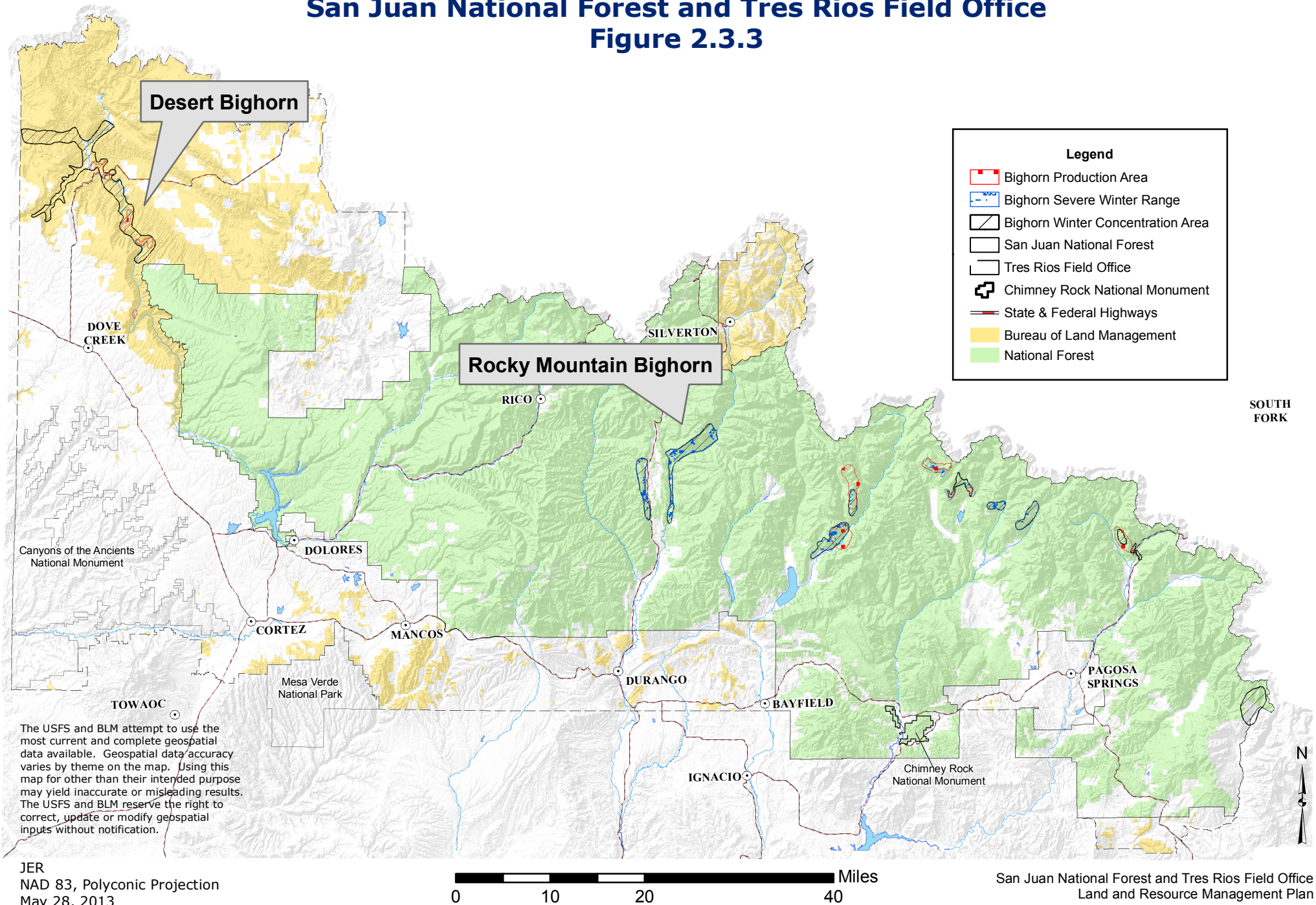
Figure 2.3.2





# Bighorn Sheep Severe Winter Range, Winter Concentration Areas and Production Areas

San Juan National Forest and Tres Rios Field Office  
Figure 2.3.3



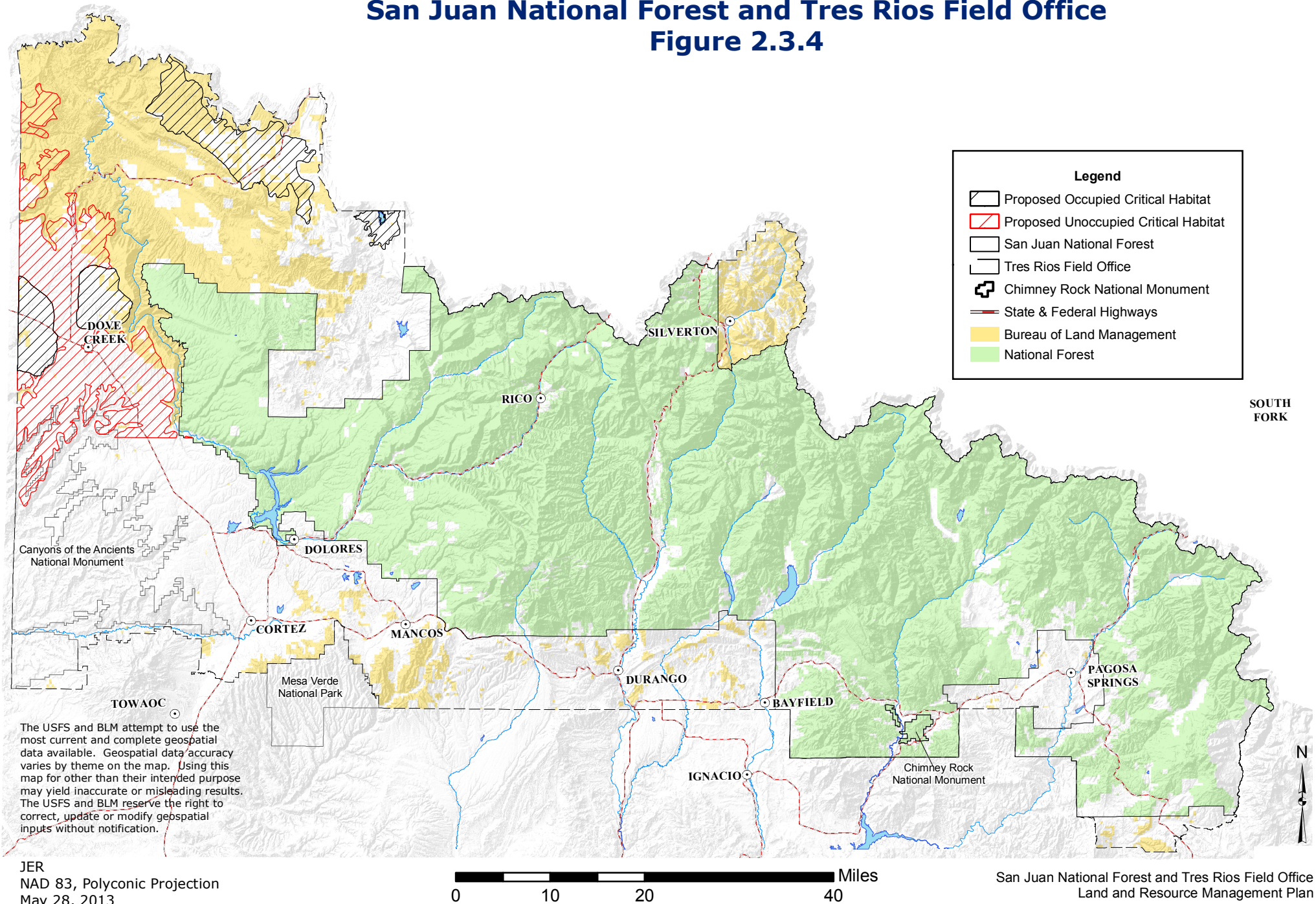


# Gunnison Sage Grouse

## Proposed Occupied and Unoccupied Critical Habitat

### San Juan National Forest and Tres Rios Field Office

#### Figure 2.3.4



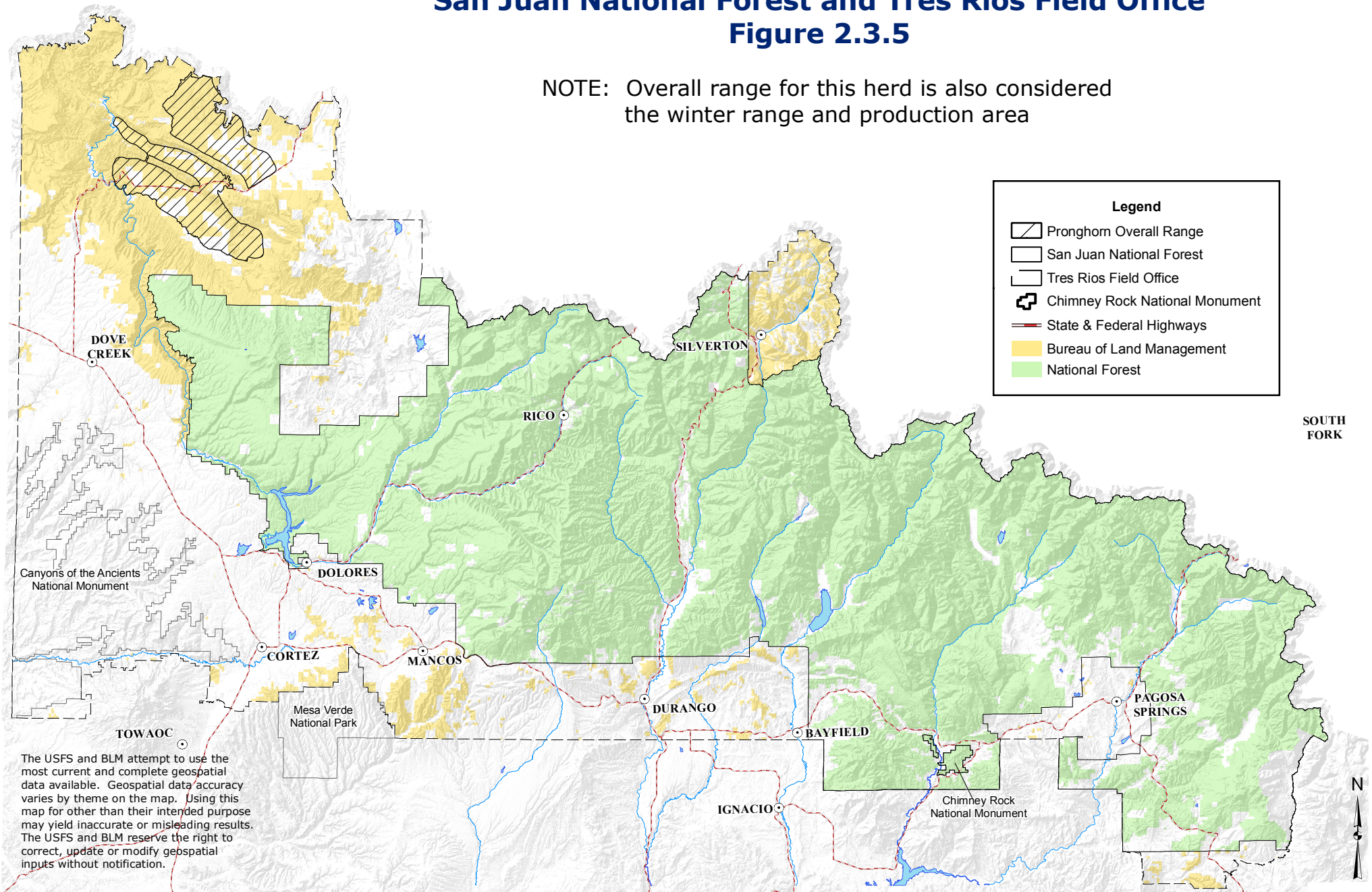


# Pronghorn Overall Range

## San Juan National Forest and Tres Rios Field Office

### Figure 2.3.5

NOTE: Overall range for this herd is also considered the winter range and production area



## 2.4 Riparian Area and Wetland Ecosystems

### Introduction

Riparian area and wetland ecosystems on SJNF and TRFO lands occur on valley floors and other low-lying landscape positions where the water table is usually at or near the land surface. They are frequently flooded or at least seasonally saturated by a fluctuating water table, and they depend on water derived from direct precipitation and upland sources. Riparian area and wetland ecosystems have soils that are somewhat poorly to very poorly drained and hydrophytic plants that are obligate-wetland or facultative-wet species (Reed 1988). These ecosystems, which are primarily associated with perennial streams on SJNF lands and perennial and intermittent streams on TRFO lands, store water, enhance water quality, provide habitat for wildlife and plants, and provide recreation and aesthetic values. Natural ecological processes and disturbances including fire, drought, wind, floods, flow regimes, and succession play a fundamental role in shaping the composition, structure, and function of riparian area and wetland ecosystems on the SJNF and TRFO.

Although they are small in extent, riparian area and wetland ecosystems represent a very important ecological component of the SJNF and TRFO. Riparian zones of the Southwest contain the greatest diversity of native vegetation communities, birds, fish, and terrestrial vertebrates (Durkin et al. 1995; Hink and Ohmart 1984; Howe and Knopf 1991; Siegel and Brock 1990). Riparian area and wetland ecosystems on SJNF and TRFO lands include a general type and four physiognomic types. The general riparian area and wetland ecosystem type is defined by its soils, topographic position, and the riparian area and wetland major vegetation type (Redders 2012). Ecosystem physiognomic types, which are defined by their soils and the dominant life form in the uppermost canopy layer, include evergreen riparian forests, deciduous riparian forests, deciduous riparian shrublands, and riparian area and wetland herbaceous lands (which include fens and hanging gardens).

These ecosystems are an important part of the LRMP's sustainable ecosystems strategy. This strategy includes maintaining or restoring the diversity and ecological integrity of ecosystems on SJNF and TRFO lands, which in turn will protect the diversity and population viability of the majority of plant and animal species within the ecosystems. See Section 2.1 in the LRMP for more information on ecosystems and the sustainable ecosystems strategy.

Riparian area and wetland ecosystems types are used in the LRMP and FEIS to describe ecosystem diversity; analyze past, current, and future ecological conditions; describe environmental impacts from management activities; and develop of LRMP components (desired conditions, objectives, standards, and guidelines). The general riparian area and wetland ecosystem type also serves as a broad-scale habitat type for terrestrial wildlife species, special status wildlife species, MIS, and plant species, and as such, provides habitat conditions that maintain species diversity and population viability for most terrestrial wildlife and plant species. Riparian area and wetland ecosystems will be monitored to determine if management activities are adversely affecting those ecosystems and the composition, abundance, distribution, and population viability of the plant and animal species that rely on those ecosystems for their habitat needs.

Certain high-elevation riparian and wetland ecosystems such as evergreen riparian forests, deciduous riparian shrublands, and herbaceous riparian areas and wetlands (including fens) are well represented in protected areas on the SJNF. Mid-elevation riparian area and wetland ecosystems such as deciduous riparian forests and shrublands, and herbaceous riparian areas and wetlands are also well represented in protected areas. The ecosystems in these areas are primarily impacted by recreation use and livestock grazing, which have caused changes in species abundance and composition in localized areas such as popular camping areas and stock watering locations. Water diversions have also impacted certain riparian areas and wetlands in protected areas.

Outside protected areas, management activities such as road construction, livestock grazing, water diversions, the construction of dams and reservoirs, timber harvest, mechanical fuels treatments, oil and gas development, recreation, utility corridor construction, and solid minerals development have caused



impacts to the soils and vegetation of riparian area and wetland ecosystems on the SJNF and TRFO. In the ecosystems impacted by these activities, there have been both direct and indirect changes in species abundance and composition, including a reduction of willows and cottonwood (*Populus* sp.) trees in deciduous riparian forests, a reduction of willows in deciduous riparian shrublands, and a reduction of sedges (*Carex* sp.) and rushes (*Juncus* sp.) in riparian herbaceous lands. Kentucky bluegrass (*Poa pratensis*; an exotic invasive grass) has replaced native sedges and rushes in many riparian area and wetland ecosystems impacted by historic unmanaged livestock grazing. Tamarisk (*Tamarix* sp.; an exotic invasive shrub that was originally planted to help stabilize stream banks) is also found in many riparian area and wetland ecosystems at the lower elevations of TRFO lands where it competes with native cottonwoods and willows.

Riparian area and wetland ecosystem management on SJNF and TRFO lands includes maintaining or restoring the composition, structure, and function of these ecosystems; maintaining adequate vegetation cover; maintaining soil productivity; protecting water quality and aquatic habitats; and preventing or minimizing adverse impacts from management actions. Management also includes developing ecosystem classification systems, conducting riparian area and wetland inventories, monitoring, identifying plants and plant communities, using the best available science, and determining the condition of riparian area and wetland ecosystems.

## Desired Conditions

- 2.4.1 Riparian area and wetland ecosystems have a diverse composition of desirable native hydrophytic plants that are vigorous and self-perpetuating. Invasive plant species are absent or rare.
- 2.4.2 Riparian area and wetland ecosystems have vegetation cover sufficient to catch sediment, dissipate energy, prevent erosion, stabilize stream banks, enhance aquatic and terrestrial wildlife habitat, and promote floodplain development.
- 2.4.3 Forest and shrubland types display hydrophytic trees and shrubs in a variety of size classes; they provide terrestrial and aquatic habitats, stream shading, woody channel debris, aesthetic values, and other ecosystem functions.
- 2.4.4 Woody debris in a variety of sizes is present in forest and shrubland riparian area and wetland ecosystem types.
- 2.4.5 Riparian area and wetland ecosystems are resilient to change from disturbances (including from floods, fire, and drought) and offer resistance and resilience to changes in climate.
- 2.4.6 Riparian area and wetland ecosystems have flow regimes and flooding processes that contribute to stream-channel and floodplain development, maintenance, and function, and facilitate the regeneration of native hydrophytic plants (including narrowleaf cottonwood [*Populus angustifolia*] and Rio Grande cottonwood [*P. deltoides* ssp. *wislizeni*]) that depend on flooding for regeneration.
- 2.4.7 The composition, structure, and function of fens and hanging gardens are intact (including their native plant species, organic soils, and hydrology).
- 2.4.8 Riparian area and wetland ecosystems that contain plant communities with G1, G2, S1, or S2 NatureServe Plant Community conservation status ranks are protected, have habitat to expand into, and have the water quantity and hydrologic systems necessary in order to support and sustain these communities.
- 2.4.9 Soil productivity is intact on all riparian area and wetland ecosystems on the SJNF and TRFO.
- 2.4.10 Long-term levels of soil organic matter and soil nutrients are maintained at acceptable levels on all riparian area and wetland ecosystems of the SJNF and TRFO.

- 2.4.11 Ground cover (vegetation and litter) is adequate to protect soils and prevent erosion on all riparian area and wetland ecosystems of the SJNF and TRFO.
- 2.4.12 Long term impacts to soils (e.g., soil erosion, soil compaction, soil displacement, puddling, and/or severely burned soils) from management actions are rare on all riparian area and wetland ecosystems of the SJNF and TRFO.

## Objectives

- 2.4.13 Within 10 years, restore the ecological integrity of four deciduous riparian shrubland sites (two on SJNF and two on TRFO lands) that currently classify as riparian herbaceous lands by increasing the canopy cover of native hydrophytic shrubs by at least 10%.
- 2.4.14 Within 10 years, determine the functional condition of 40 miles (25 miles on TRFO and 15 miles on SJNF lands) of riparian area and wetland ecosystems using the Proper Functioning Condition assessment method (Prichard 1998).
- 2.4.15 Within 15 years, treat three fens on TRFO lands and two fens on SJNF lands with impaired functions.
- 2.4.16 Within 5 years, eradicate tamarisk and Russian olive (*Elaeagnus angustifolia*) on two stream reaches or two seeps/springs on TRFO lands, and if needed conduct follow-up treatment to prevent the establishment or spread of other invasive species.
- 2.4.17 Maintain native riparian and upland ecosystems that have been treated to control non-native species on a minimum of 50 miles of TRFO stream reaches over the next 20 years.
- 2.4.18 Maintain or restore native riparian ecosystems and connected uplands that have been treated to control non-native species on a minimum of 50 miles on the Dolores River and its tributaries on TRFO lands over the next 20 years.

## Standards

- 2.4.19 Long term adverse effects to the hydrology, soils, and vegetation of fens and hanging gardens from management activities in or adjacent to them (including motorized travel, road construction, water pumping, and peat removal) must not occur.
- 2.4.20 Agency actions in protected areas must not adversely affect the long-term ecological integrity of the riparian area and wetland ecosystems within them.
- 2.4.21 Management actions must not cause long-term change away from desired conditions in riparian or wetland vegetation communities.

## Guidelines

- 2.4.22 Agency actions should avoid or otherwise mitigate long-term adverse impacts to riparian areas and wetlands.
- 2.4.23 Agency actions should avoid or otherwise mitigate long-term adverse impacts in riparian area and wetland ecosystems that have plant communities with G1, G2, S1, or S2 NatureServe Plant Community conservation status ranks, including wild privet (*Forestiera pubescens*) shrublands and boxelder/river birch (*Acer negundo/Betula fontinalis*) woodlands, in order to maintain the ecological integrity of those rare plant communities.
- 2.4.24 Agency actions should avoid or otherwise mitigate damage to the long-term soil productivity of riparian area and wetland ecosystems.

- 2.4.25 Livestock browsing should not remove more than 25% of the annual leader growth of hydrophytic shrubs and trees.
- 2.4.26 Agency actions should avoid or otherwise mitigate adverse impacts to the abundance and distribution of willows to maintain or improve the ecological integrity of riparian area and wetland ecosystems.
- 2.4.27 Certified, weed-free native seed mixes of local ecotypes should be used to revegetate riparian area and wetland ecosystems where commercially available. Non-native, non-invasive plant material may be used in limited situations where considered necessary in order to protect resources and/or stabilize soils in a timely fashion. Persistent non-natives or invasive exotic plant species should be avoided.
- 2.4.28 Woody riparian vegetation along low-gradient ephemeral and permanent stream channels should be maintained or restored to ensure terrestrial food sources for invertebrates, fish, birds, and mammals, and to minimize water temperature changes.

### **Additional Guidance**

The principal guidelines used to protect all riparian areas and wetlands on SJNF lands are found in the Region 2 Watershed Conservation Practices Handbook (Region 2 FSH 2509.25-2006-1). This handbook contains guidelines that prevent adverse impacts, maintain or improve stream health, preserve ecosystem function, prevent stream sedimentation, and reclaim disturbed sites. Additional guidance includes:

- Colorado River Basin Salinity Control Act of 1974
- Clean Water Act of 1977
- EOs 11288, 1966; 11752, 1973; 11988, 1977; 11990, 1977
- FSM 2500
- FSH 2500
- MOU between the Colorado Department of Natural Resources and the USFS, 2004
- MOU between the Colorado Department of Natural Resources, the Colorado Water Conservation Board, and the BLM, 2005
- FSM 2070
- FSH 2509.13 Burned Area Emergency Rehabilitation.
- Additional standards and guidelines associated with riparian area and wetland ecosystems are found in Sections 2.2 and 2.7.

## **2.5 Aquatic Ecosystems and Fisheries**

### **Introduction**

Aquatic ecosystems of the SJNF and TRFO support a variety of water-dependent species, populations, and communities of plants and animals. These ecosystems include various types of flowing and standing waters that provide aquatic habitats sufficient to support the many biotic communities that depend on abundant, clean waters. The major biological components of these ecosystems include fish, amphibians, macroinvertebrates, zooplankton, macrophytes, and periphyton communities. The physical components are composed of features such as stream gradient, sinuosity, substrate material, stream bank material, large woody debris, and most importantly, water (refer also to Section 2.6, Water Resources).

These aquatic ecosystems play a critical role in the social, economic, and ecological well-being of the region. In addition to supporting some of the richest and most productive habitats for a variety of wildlife and plant species, they provide municipal and industrial water to communities, and serve as one of the primary recreational resources of the area. According to the USFWS National Survey of Fishing, Hunting, and Wildlife-Associated Recreation, fishing related expenditures contributed over \$41.8 billion to the U.S. economy in 2011 (USFWS 2013b). Over 33 million anglers, 27 million of which were freshwater anglers, contributed an average of \$1,261 each to local economies, and the demand for fishing-related recreation

continues to increase annually. The national statistics for 2011 represent an 11% increase over those observed for 2010. Waters of the SJNF and TRFO provide some of the best fishing opportunities the western United States has to offer, including pristine wilderness lakes and streams that support outstanding trout fisheries and lower elevation lakes that provide exceptional fishing for warm-water species such as bass (*Perciformes*), pike (*Esox* sp.), and sunfishes (*Centrarchidae*).

Although many of the waters in the planning area are in excellent condition, just as many have been altered over time. Starting with the early settlement periods, a variety of land management activities occurring throughout the area have altered the physical integrity of SJNF and TRFO aquatic ecosystems. Recreation activities, mining, oil and gas development, livestock grazing, timber harvesting, road construction, and numerous water-development projects have individually and collectively reduced the quantity and quality of aquatic habitats. As a result, the ability to support healthy, self-sustaining populations of fish and other aquatic biota has been reduced in a number of the streams and rivers located within the planning area. This is most evident in areas impacted by consumptive uses of water. The cumulative impacts of hundreds of existing water developments have resulted in adverse and ongoing impacts to the composition, structure, and function of aquatic ecosystems. Where fish population monitoring has been conducted downstream of major water developments, significant decreases in population densities have been observed.

In addition to the physical alterations described above, biological components have also been altered. The introduction of non-native fish species, as well as the occurrence of potentially lethal pathogens, has contributed to the decline of some species. For example, the stocking of non-native trout species occurring over several decades has come at a significant cost to native cutthroat trout populations. Native sucker species have also declined due to the loss of aquatic habitat, and as a result of hybridization with the introduced white sucker (*Catostomus commersonii*). The parasite *Myxobolus cerebralis*, which causes whirling disease in trout, is becoming more widespread throughout the planning area and is known to have increased mortality rates for infected trout populations.

More recently, fish population levels have been affected by prolonged drought. The reduction in annual precipitation has reduced natural stream flows, increased water temperatures, and at the same time resulted in increased demand for water for human consumptive uses. Without proactive management efforts that address the ongoing and future demand for consumptive water uses, aquatic habitats, and fish populations are likely to experience additional adverse impacts.

The SJNF and TRFO aquatics programs strive to provide the ecological conditions within their streams, rivers, and lakes, sufficient to support a diversity of native and desired non-native fish species and other aquatic biota over the long term. Proactive management of aquatic habitats and populations is critical to reversing downward population trends. Special emphasis is given to recovery efforts for native cutthroat trout (*Oncorhynchus clarkii*) subspecies. Management of the Colorado River cutthroat trout (*O.c. pleuriticus*) is guided by the Conservation Agreement and Strategy for Colorado River Cutthroat Trout in the States of Colorado, Utah, and Wyoming (Colorado River Cutthroat Trout Task Force 2001). Management of the “greenback lineage” subspecies (*O.c. stomias*) applies the same principles as those for Colorado River cutthroat, but also is also guided by the Greenback Cutthroat Trout Recovery Plan (USFWS 1998a).

Land management activities that incorporate the LRMP objectives for aquatic habitats, implement BMPs, maintain stream flows, and implement site-specific mitigation measures will reduce the risks to SJNF and TRFO aquatic ecosystems. LRMP implementation and consistent monitoring of outcomes for fisheries and aquatic habitats will provide baseline data and allow for assessments of overall trends for aquatic habitats and fish populations. Periodic inventories and surveys of streams and lakes are needed in order to determine the natural range of aquatic habitat conditions, habitat quality, population levels, and overall aquatic ecosystem health. Habitat improvement projects should be designed and implemented where limiting factor assessments have specifically identified habitat-related constraints to aquatic populations. Inventory and monitoring will also provide the information necessary to help identify needs for possible LRMP amendments or other changes in management practices. Scientific efforts to track changing conditions in key habitats, and for specific species, are an important step in accomplishing objectives and achieving desired conditions for the aquatics program.

LRMP implementation involves close coordination with CPW and the USFWS. In addition, partnerships with other state and federal agencies, as well as with interested individuals and organizations, are also an important means to achieve desired conditions and accomplish multiple objectives. Partnerships will yield much needed funding for aquatic habitat management activities.

Most importantly, water developments and other authorized special uses that impact aquatic ecosystems should contain terms and conditions necessary to minimize the severity of impacts and ultimately achieve LRMP objectives and desired conditions. The FLPMA specifies that special uses granted by the Secretary of Agriculture or the Secretary of the Interior are subject to terms and conditions that “minimize damage to fish and wildlife habitat and otherwise protect the environment.” In addition, the Aquatic Resource Management Manual requires the BLM to establish aquatic resource management objectives in land use plans (Section 6720.13B) and to identify the flow needs and water quality requirements for aquatic habitats (Section 6720.15 and 6720/16).

Ensuring adequate stream flow and lake levels are prerequisites to maintaining healthy aquatic ecosystems and providing for the long-term viability of fish populations. Cooperative and collaborative efforts are the preferred approach to sustaining aquatic ecosystems and ensuring that viable populations of aquatic species are maintained or improved. While the land management agencies see water development as a legitimate use of public lands, those consumptive uses must be balanced with the many other legitimate uses for water on the SJNF and TRFO. Toward that end, a variety of options will be considered for the continued authorization of existing water facilities and for the development of new consumptive water uses, while ensuring that minimum levels of instream flow will be maintained adequate to meet the applicable regulatory requirements and the goals and objectives of the SJNF and TRFO.

As described in Section 2.1, the LRMP applies three approaches to ensure the maintenance of species diversity and long-term population viability, as applicable to each agency: the designation of protected areas, the ecosystem management strategy, and a species-specific management strategy that addresses the special needs of certain species. Management direction has been developed that is intended to address the legal, regulatory, and policy requirements for species diversity and population viability. A range of key ecosystem elements were identified and the relative importance of those elements to maintaining species diversity and population viability was determined. The desired future conditions, management objectives, and standards and guidelines listed below were developed for those elements found to be most critical to the maintenance of species diversity and population viability for aquatic species (Volume III, Appendix Q).

## **Aquatic Special Status Species**

Aquatic special status species for the SJNF and TRFO are listed in Table 2.5.1. These species receive special management emphasis due to their historic declines and present concern about their viability. In addition to the LRMP components that specifically address some of the needs of these species, the SJNF and TRFO use additional guidance in the form of recovery plans and conservation strategies, examples of which are listed within Table 2.5.1. The common objective among the LRMP components, recovery plans, and conservation strategies are to 1) stabilize and maintain existing populations, and 2) expand the distribution and overall abundance of these species to a point where long-term viability is no longer of concern. The LRMP components were developed with these two fundamental objectives in mind.

Unless a formal change in the status of greenback lineage cutthroat trout is recognized by the USFWS, populations of greenback lineage cutthroat trout on the SJNF and TRFO will be treated as a federally listed species and afforded full protection under the ESA. The Greenback Cutthroat Trout Recovery Plan (USFWS 1998a) will be used as management guidance for greenback lineage populations on the SJNF and TRFO.

In addition, agency actions that result in consumptive water uses must be in compliance with the Section 7 Agreement and Recovery Implementation Program Action Plan (USFWS 1993) and San Juan Basin Recovery Implementation Program (USFWS 2003) for four endangered fish species found in the Upper Colorado and San Juan River systems (Colorado pikeminnow [*Ptychocheilus lucius*], razorback sucker [*Xyrauchen texanus*], humpback chub [*Gila cypha*], and bonytail [*G. elegans*]).

**Table 2.5.1: Special Status Aquatic Species for the San Juan National Forest and Tres Rios Field Office**

<b>Aquatic Special Status Species</b>	<b>Current Status</b>	<b>Species Management Plan</b>
Colorado River cutthroat trout ( <i>Oncorhynchus clarki pleuriticus</i> )	Region 2 Sensitive Species BLM Sensitive	Conservation Agreement and Strategy for Colorado River Cutthroat Trout in the States of Colorado, Utah, and Wyoming (Colorado River Cutthroat Trout Task Force 2001)
Greenback lineage cutthroat trout ( <i>Oncorhynchus clarki stomias</i> )	USFWS Threatened	Greenback Cutthroat Trout Recovery Plan (USFWS 1998a)
Bluehead sucker ( <i>Catostomus discobolus</i> )	Region 2 Sensitive BLM Sensitive	Bluehead Sucker: A Technical Conservation Assessment (USFS 2005b)
Flannelmouth sucker ( <i>Catostomus latipinnis</i> )	Region 2 Sensitive BLM Sensitive	Flannelmouth Sucker: A Technical Conservation Assessment (USFS 2005c)
Roundtail chub ( <i>Gila robusta robusta</i> )	Region 2 Sensitive BLM Sensitive	Roundtail Chub: A Technical Conservation Assessment (USFS 2005d)
Boreal toad ( <i>Bufo boreas boreas</i> )	Region 2 Sensitive BLM Sensitive	Boreal Toad Conservation Plan and Agreement (USFWS 2001b)
Colorado pikeminnow ( <i>Ptychocheilus lucius</i> )	USFWS Endangered BLM Sensitive (present on BLM lands only)	Recovery Implementation Program for Endangered Fish Species In The Upper Colorado River Basin (USFWS 1995), Colorado Squawfish Recovery Plan (USFWS 1991)
Downstream big river fishes Note: Three species (razorback sucker, humpback chub, bonytail) are not present on the SJNF or TRFO, but are affected by management actions on the SJNF and TRFO that result in water depletions to the lower basins.	USFWS Endangered BLM Sensitive	Recovery Implementation Program for Endangered Fish Species In The Upper Colorado River Basin (USFWS 1995), San Juan River Basin Recovery Implementation Program (USFWS 2003), Razorback Sucker Recovery Plan (USFWS 1998b), Bonytail Chub Revised Recovery Plan (USFWS 1990a), Humpback Chub Recovery Plan (USFWS 1990b)

## Aquatic Management Indicator Species

Aquatic MIS for the SJNF are identified in Table 2.5.2. The table also lists factors of concern and management issues addressed for the SJNF. These species are selected to primarily assess the effects of management activities on populations of aquatic species and their associated habitats. Significant changes in MIS populations, or their habitats, would necessitate a review of current management direction to ensure that SJNF management is not adversely affecting the composition, structure, or function of aquatic ecosystems and their dependent species. Monitoring and evaluation of population trends of these species and their habitats are specifically addressed within the LRMP Monitoring Plan. (see Chapter 4, Monitoring Plans).

**Table 2.5.2: Management Indicator Species for the San Juan National Forest**

Management Indicator Species	Factors of Concern	Primary Management Issues
Cutthroat trout ( <i>Oncorhynchus clarki</i> )	Lentic and lotic habitats: water quantity, water quality, physical habitat features, invasive species, disease	Effects to water quantity due to water depletions associated with reservoirs, diversions, and oil and gas development.
Brook trout ( <i>Salvelinus fontinalis</i> )		
Brown trout ( <i>Salmo trutta</i> )		Effects to water quality and water temperature due to soil erosion and sedimentation associated with ground-disturbing activities (fuels treatments, oil and gas development, timber harvest, livestock grazing, road construction, and recreation).
Rainbow trout ( <i>Oncorhynchus mykiss</i> )		Inadvertent exotic and invasive species introductions.

## Desired Conditions

- 2.5.1 Long-term sustainability of aquatic ecosystems is maintained.
- 2.5.2 Streams, lakes, riparian vegetation, and adjacent uplands provide habitats adequate to maintain healthy aquatic ecosystems capable of supporting a variety of native and desired non-native aquatic communities.
- 2.5.3 The quantity and quality of aquatic habitats are maintained or enhanced to provide for the long-term sustainability of biological diversity and population viability of all native and/or desired non-native vertebrate species.
- 2.5.4 Channel characteristics, water quality, flow regimens, and physical habitat features are diverse and appropriately reflect the climate, geology, and natural biota of the area.
- 2.5.5 An adequate range of stream flow provides for the long-term maintenance of physical habitat features. Channel features, including bank stability, width-to-depth ratio, pool/riffle ratio, pool depth, slope, sinuosity, cover, and substrate composition, are commensurate with those expected to occur under natural ranges of stream flow.
- 2.5.6 Water flow conditions in streams, lakes, springs, seeps, wetlands, fens, and aquifers support functioning habitats for a variety of aquatic and semi-aquatic species and communities.
- 2.5.7 Macroinvertebrate diversity and abundance reflect high water quality.
- 2.5.8 Populations of aquatic species are adequately mobile, genetically diverse, and functionally diverse throughout the planning area.
- 2.5.9 Aquatic systems are connected in a manner that avoids fragmentation of aquatic habitats and isolation of aquatic species. Connectivity between water bodies provides for all life history functions of aquatic species except where barriers are beneficial and necessary to achieve conservation goals for certain aquatic species.
- 2.5.10 All native and desired non-native fish species are disease free and thrive in the vast majority of systems historically capable of supporting such species.

- 2.5.11 Abundant Colorado River cutthroat trout populations are maintained and other areas are managed for increased abundance.
- 2.5.12 Threats to Colorado River cutthroat trout and its habitat are eliminated or reduced to the greatest extent possible.
- 2.5.13 The distribution of Colorado River cutthroat trout is increased where ecologically, sociologically, and economically feasible.

## Objectives

- 2.5.14 Annually evaluate seven streams (five streams on NFS lands and two on BLM lands) for adequacy of instream flows sufficient to maintain population viability and otherwise achieve LRMP direction.
- 2.5.15 Annually enhance or restore at least 4 miles of stream habitat (3 miles on NFS lands and 1 mile on BLM lands) to maintain or restore the structure, composition, and function of physical habitat for USFS and BLM sensitive species or USFS MIS species.
- 2.5.16 Over the life of the LRMP, connect at least 10 miles of fragmented stream habitat (8 miles on NFS lands and 2 miles on BLM lands) to provide for aquatic species movement.
- 2.5.17 Over the life of the LRMP, establish two self-sustaining meta-populations on NFS lands, each consisting of five separate but interconnected sub-populations. In addition, establish one new population in each Geographic Management Unit within the historic range (Colorado River Cutthroat Trout Task Force 2001).

## Standards

- 2.5.18 Where native or desired non-native fish species occur, or should occur, a minimum level of aquatic habitat shall be maintained by identifying the minimum flow rates required to support that habitat using at least one of the following four options (2.5.19a–2.5.19d):
  - 2.5.18a. From April 1 through September 30, an instantaneous minimum flow equal to 40% of the average annual flow; from October 1 through March 31, an instantaneous minimum flow equal to 20% of the average annual flow (Tennant 1972).
  - 2.5.18b. Stream flow in riffle habitats shall be maintained at levels that maintain the minimum values for mean water depth, wetted perimeter, and mean velocity, as defined in Table 2.5.3, for each stream size category (e.g., bankfull width).
  - 2.5.18c. Stream flow in each reach shall be sufficient to maintain a minimum of 50% of the weighted usable area, for each life stage of each target species (USFWS 1984). The weighted usable area baseline (100%) will be the amount of habitat that would occur under natural, unaltered flow conditions.
  - 2.5.18d. Stream flow in each reach shall be maintained at levels that have been determined using alternate methods and where it can be clearly demonstrated, to the satisfaction of the USFS and/or BLM, that said flows will be adequate to achieve the LRMP's goals and objectives for population viability and sustainable aquatic ecosystems.

**Table 2.5.3: Metrics Applicable to Standard 2.5.18b**

Bankfull Width (feet)	Mean Depth (feet)	Wetted Perimeter (%)	Mean Velocity (feet/second)
1–2	≥ 0.2	50	1.0
21–40	0.2–0.4	50	1.0
41–60	0.4–0.6	50–60	1.0
> 60	> 0.6	> 60	1.0



- 2.5.19 Prior to use in other waters, all agency, partnering agency, and contractor field equipment having had contact with whirling disease waters must be decontaminated using current decontamination procedures.
- 2.5.20 To prevent the spread of chitrid disease, established decontamination protocols must be used when working in waters and water influence zones for current and historic breeding sites for all sensitive and listed aquatic and amphibious species.

## Guidelines

- 2.5.21 Agency actions should maintain or improve all existing habitat for designated conservation populations of Colorado River cutthroat trout (Colorado River Cutthroat Trout Task Force 2001).
- 2.5.22 Minimum pool levels should be established for water storage facilities where aquatic USFS MIS and/or BLM or USFS sensitive species occur.
- 2.5.23 Except where barriers are beneficial and necessary to achieve conservation goals for certain aquatic species, fragmentation of aquatic habitats and isolation of aquatic species should be avoided.
- 2.5.24 Sediment delivery to streams occupied by MIS or threatened, endangered, or sensitive species should be avoided.
- 2.5.25 Activities that may cause sedimentation to amphibian habitats should be minimized.
- 2.5.26 Drainage of acid-mine runoff into riparian areas and wetland amphibian habitats should be avoided.
- 2.5.27 Agency actions should avoid or mitigate impacts within 100 feet of boreal toad (*Bufo boreas boreas*) breeding sites between May 15 and September 30 (breeding season).
- 2.5.28 Agency actions should maintain or improve hydrologic function and water quality of known and historic breeding sites for all sensitive and listed aquatic and amphibious species to provide for effective habitat.

## Additional Guidance

- FSH 2509.19, Watershed Conservation Practices Handbook
- FSH 2509.25, Watershed Conservation Practices Handbook (Region 2 Supplement)
- FSM 2600, Wildlife, Fish, and Sensitive Plant Habitat Management
- FSH 2609.13, Wildlife and Fisheries Program Management Handbook
- Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development (2007)
- Greenback Cutthroat Trout Recovery Plan (USFWS 1998a)
- Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin (USFWS 1995)
- San Juan River Basin Recovery Implementation Program (USFWS 2003)
- Razorback Sucker Recovery Plan (USFWS 1998b)
- Colorado Squawfish Recovery Plan (USFWS 1991)
- Bonytail Chub Revised Recovery Plan (USFWS 1990a)
- Humpback Chub Recovery Plan (USFWS 1990b)
- Range-wide Conservation and Strategy for Roundtail Chub, Bluehead Sucker, and Flannelmouth Sucker (Utah Department of Natural Resources 2006)
- Conservation Agreement and Strategy for Colorado River Cutthroat Trout in the States of Colorado, Utah, and Wyoming (Colorado Cutthroat Trout Task Force 2001)
- BLM Manual 6720, Aquatic Resource Management, Fish and Wildlife Management
- BLM Manual 6840, Sensitive Species Management (2008)

- Inventory and Monitoring: Recommended Techniques for Reptiles and Amphibians (Graeter et al. 2013)
- Boreal Toad Conservation Plan and Agreement (USFWS 2001b)
- Fungus Contamination Prevention Guidelines found in CPW Procedures for Monitoring and Surveying Boreal Toad Populations, 2004

Standards and guidelines for aquatic invasive species are also found in Section 2.8, Invasive Species.

## **2.6 Water Resources**

### **Introduction**

The planning area encompasses the headwaters of several large river systems including the San Juan, Piedra, Los Pinos, Florida, Animas, and Dolores Rivers. These river systems are vital resources to several western states. The upper-elevation mountainous areas of the SJNF and TRFO receive relatively abundant precipitation, and perennial streams, lakes, and other water features are common on the landscape. Lower-elevation lands receive much less precipitation and they generally tend to have fewer (although larger) perennial rivers and more intermittent or ephemeral water bodies.

### **Water Quality**

Water quality within the planning area is typically good. In the few surface water bodies exhibiting water quality problems, mercury, heavy metals, salinity, and sediment are the common pollutants. The protection of groundwater from pollution sources is a challenging issue in the planning area. Oil and gas development proposals often have potential to impact groundwater.

Water quality within the planning area is protected primarily through project design, BMPs, and other mitigation measures. BMPs are applied in an adaptive management fashion that includes implementing BMPs, monitoring the implementation and effectiveness of the BMPs, and adjusting management actions if the BMPs are found to not adequately protect water quality. Many water quality mitigation measures and additional guidance for the USFS are contained in the Rocky Mountain Region Soil and Water Conservation Practices Handbook, FSH 2509.25.

The highest priorities for improving water quality will be water bodies included on Colorado's Section 303(d) List of Impaired Waters, saline soil watersheds, priority watersheds identified through the Watershed Condition Framework (USFS 2012a), and/or watersheds identified as having the highest level of anthropogenic disturbance (see Volume III, Appendix I). Monitoring the implementation and effectiveness of water quality improvement projects and water quality protection measures will continue to be a required component to meeting the intent of the Clean Water Act throughout the planning area. In compliance with the Colorado River Basin Salinity Control Act, the SJNF and TRFO will use watershed restoration, stream enhancement, erosion control, and other measures to reduce or prevent salt from entering tributaries of the Colorado River.

### **Maintain or Improve Watershed Condition and the Function of Streams and Floodplains**

Streams of the SJNF and TRFO should effectively transport sediment and a natural range of flows, including periodic floods. Streams should also provide aquatic and riparian habitat, and support a broad spectrum of recreational opportunities.

Many watersheds throughout the planning area exhibit poor watershed conditions as a result of the cumulative impacts of management activities. For example, high road densities, as well as poor road placement, design, and maintenance, have caused water quality, floodplain, and channel morphology changes in some watersheds. Poor condition watersheds have been identified through the Watershed Condition Framework (USFS 2012a) and the San Juan National Forest Aquatic Ecosystem Assessment (USFS 2006). Similar landscape-scale watershed condition assessments have not yet been completed

for BLM lands. BLM and USFS watersheds of concern are listed in Volume III, Appendix I. Priority watersheds as designated through the Watershed Condition Framework are displayed on the online USFS Watershed Condition Classification map viewer (USFS 2013). Watersheds where integrated restoration efforts have the best chance of successfully improving impaired watershed conditions or can maintain properly functioning watershed conditions will be given priority for restoration.

## **Manage Water Uses**

Existing water development projects range in size from small ponds and irrigation ditches to large-scale diversion and storage projects (such as the Dolores Project/McPhee Reservoir). Many of these projects have long-term impacts to aquatic resources within the planning area. Due to increasing public demand, proposals for new water development projects continue to increase. Addressing increasing water demands while, at the same time, maintaining the integrity of aquatic ecosystems may be one of the biggest challenges to public lands management over the next few decades.

Existing non-federal water uses and proposed new uses on SJNF and TRFO lands are authorized pursuant to applicable federal authorities, current agency policies and directives, and additional consideration given to applicable interagency MOUs and agreements. Surface water and groundwater development authorizations (both new and re-issuances) must contain the necessary terms and conditions to meet terrestrial, aquatic, and/or other resource management desired conditions and objectives as required by the FLPMA.

Where water is necessary for federal uses within the planning area, water rights for consumptive uses will be obtained by the USFS and BLM. Federal purposes typically include water for livestock, recreation, aesthetics, facilities, evaporation, irrigation, augmentation and exchange, administrative sites, firefighting purposes, and terrestrial and aquatic wildlife. The successful management of water uses will require extra attention to administrative process and details. One important task will be a monthly review of water rights resumes. The SJNF and TRFO may engage in proceedings for new water rights applications, change applications, or reassertion of conditional water rights if necessary to protect USFS and BLM water rights or natural resources.

When evaluating priorities for flow and habitat protection, streams supporting federally listed species and/or sensitive species, streams that have a high level of recreational use(s), and perennial streams that are currently undeveloped (no existing water developments) will be emphasized.

## **Desired Conditions**

### ***Water Quality***

- 2.6.1 State water quality standards and anti-degradation rules are met and state-classified water uses are supported for all water bodies.
- 2.6.2 Water quality for impaired water bodies on the State of Colorado's 303(d) list move toward fully supporting state-classified uses.
- 2.6.3 State "Outstanding Waters" within the planning area maintain the high levels of water quality necessary for this status.
- 2.6.4 Watersheds within the planning area containing saline soils exhibit stable upland, riparian, and channel conditions that produce water quality as close as possible to reference conditions (as defined in FSH 2509.25 for the USFS); they produce the lowest possible saline contributions to the upper Colorado River (per the Colorado River Basin Salinity Control Act for the BLM) (see Volume III, Appendix I for saline watersheds).
- 2.6.5 Water from SJNF and TRFO lands will meet applicable drinking water standards when given adequate and appropriate treatment. Management activities throughout the planning area protect and/or enhance the water quality of municipal supply watersheds (as defined in FSM 2542 for the USFS). Enhancement may be achieved by watershed restoration or other activities.

### ***Stream Channels and Floodplains***

- 2.6.6 Stream channel types that naturally build floodplains are connected to their floodplains and riparian areas, maintain the ability to transport overbank flows (which occur on the average every 1.5 years), and are capable of transporting moderate or high flow events.
- 2.6.7 Physical channel characteristics are in dynamic equilibrium and commensurate with the natural ranges of discharge and sediment load provided to a stream. Streams have the most probable form and the expected native riparian vegetation composition within the valley landforms that they occupy; they function correctly without management intervention.
- 2.6.8 Historically disturbed and degraded stream channels recover through floodplain development; establishment of riparian vegetation with correct structure, composition, and function; and stable channel geomorphic characteristics.

### ***Groundwater Resources***

- 2.6.9 Aquifers maintain natural conditions of recharge and discharge, especially where they are important to surface features dependent on groundwater for their existence (including caves, karst, springs, seeps, lakes, riparian areas, hanging gardens, wetland ecosystems, fens, and intermittent and perennial streams).
- 2.6.10 Potentially usable aquifers and water-bearing intervals possessing groundwater of quality and/or quantity that could provide multiple-use benefits and maintain water quality at natural conditions.
- 2.6.11 Administrative and permitted activities on the SJNF and TRFO do not contribute to the reduction of surface water or groundwater that supplies seasonal springs, seeps, small ponds, and small wetlands considered most vulnerable to a changing climate.

### ***Watershed Conditions, Watershed Scale, and Water Uses***

- 2.6.12 Upland areas function properly and do not contribute to stream-channel degradation.
- 2.6.13 The majority of undeveloped and unregulated or free-flowing streams within the planning area are retained in their current undeveloped condition; they provide potential reference conditions and offer unique opportunities for aquatic habitat, recreation, species conservation, and pleasing aesthetics.
- 2.6.14 The overall function and integrity of streams impacted by water developments are adequately protected for their baseline ecological and recreational values. This is accomplished by providing for adequate stream flows as part of water development planning for existing or new water development projects. This includes sustaining ecological processes dependent on flow within the impacted watersheds.
- 2.6.15 In unique cases where water is transferred from one catchment to another, water lost (i.e., there is no return flow) from watersheds as a result of water transfer does not adversely alter or impact the aquatic ecology of the watershed or the stream. Conversely, aquatic ecology and stability of the streams and watersheds receiving imported water are not adversely impacted.
- 2.6.16 All water developments for federal purposes have state water rights, if applicable. The beneficial use of water continues over the implementation life of the LRMP, when the water is available.
- 2.6.17 All approved water developments that involve the use of SJNF and TRFO lands are permitted pursuant to applicable federal authorizations.

## **Objectives**

### ***Water Quality***

- 2.6.18 Work with the selenium task force annually to reduce salt delivery to the upper Colorado River Basin.
- 2.6.19 Every 5 years rehabilitate 10 or more acres to reduce erosion and sedimentation delivery to water bodies on both TRFO and SJNF lands. For SJNF lands, conduct the work in priority watersheds, including those with water bodies listed for sediment impairment or that have total maximum daily loads (TMDLs) established for sediment.
- 2.6.20 Over the implementation life of the LRMP, actively participate in the development of all of the TMDL determinations and/or other appropriate options for the restoration of State of Colorado 303(d) listed impaired water bodies within the planning area (both TRFO and SJNF lands).
- 2.6.21 Over the life of the LRMP, implement BMPs to minimize management impacts to water quality on TRFO and SJNF lands. The effectiveness of BMPs will be improved if necessary through adaptive management.

### ***Maintain or Improve Watershed Condition and Stream/Floodplain Function***

- 2.6.22 Annually, treat approximately 20 acres or more in SJNF priority watersheds in order to improve poor watershed conditions or maintain good watershed conditions. The goal is to move a watershed from an impacted condition class to a better condition class or to maintain a good condition class.
- 2.6.23 Annually decommission 6 linear miles or more of unneeded routes that may consist of roads and/or trails on SJNF lands. Routes will be decommissioned on TRFO lands as identified through the travel management planning process. Watersheds listed in Volume III, Appendix I could be considered priority for decommissioning efforts. Watersheds designated as priority through the USFS Watershed Condition Framework should also be focus areas for route decommissioning.

### ***Managing Water Uses***

- 2.6.24 Annually acquire new appropriated water rights for 30 USFS water uses (including water rights for livestock, recreation, administrative, or other uses) within the planning area. For TRFO lands, pursue appropriated water rights for new or outstanding BLM water uses.
- 2.6.25 Over the implementation life of the LRMP, put all consumptive use water rights owned by the BLM and USFS to beneficial use and that use documented.
- 2.6.26 Based on review of monthly water court resumes, enter into any water court case necessary to protect BLM or USFS water rights and water-dependent resources.
- 2.6.27 Over the life of the LRMP, enforce compliance where the USFS or BLM place conditions and other requirements on special use authorizations related to water diversion or storage that are outside the jurisdiction of the Colorado Division of Water Resources.
- 2.6.28 Over the next 10 years, improve the efficiency of water and energy use at all administrative facilities on the SJNF by using the minimum consumption practicable.

## **Standards**

- 2.6.29 Land use activities (new projects, or replacement/retrofitted/reconstructed/reauthorized projects) must not impact potentially useable groundwater quality or quantity to the extent that groundwater-dependent features are adversely affected. Examples of some groundwater-dependent features are springs, seeps, fens, and intermittent or perennial streams.

- 2.6.30 Activities must not be allowed within aquatic management zones that will cause a long-term change from desired conditions. The protection or improvement of riparian values, water quality, aquatic community, and for long-term stream health in these areas must be emphasized. Aquatic management zones have a minimum horizontal width from the top of each bank of 100 feet or the mean height of the mature late-seral vegetation, whichever is greater.
- 2.6.31 In all places where technically feasible, pitless, self-contained drilling systems (e.g., closed loop drilling systems) must be used for all leasable fluid minerals wells.

## **Guidelines**

- 2.6.32 Roads and trails that are removed from the SJNF transportation network, as well as maintenance level 1 roads (i.e., roads that have been closed to the public but may be used in the future principally for administrative purposes), should be treated sufficiently where no further management intervention would be necessary in order to sustain long-term natural processes. This will avoid future risks to watershed functions, water quality, and/or aquatic habitat. Sufficient treatments may include removal of unstable fills, effective and permanent breaching of drainage ditches, elimination of persistent in-sloped road surfaces; complete removal of stream-crossing structures and associated fills with restoration of floodplains, and the maintenance or restoration of fish passages.
- 2.6.33 Ditches authorized on the SJNF or TRFO should maintain a sufficient freeboard above the water line of the ditch to avoid or minimize damage to the ditch or from overtopping. Headgates and conveyance structures should be maintained in good functioning condition and should be clear of sediment and other debris in order to ensure proper operation. The operator should close the headgate at the end of the diversion (e.g., irrigation) season.
- 2.6.34 Water conveyance structures authorized on the SJNF or TRFO should be maintained to prevent and control soil erosion and gulying on adjacent lands resulting from operations and maintenance of the structure. Design criteria may include maintaining the ditch channel to prevent downcutting and ditch failure, removal of all obstructions from the channel, and prompt remediation of pipeline breaks and ditch failures, and rehabilitation of any erosion resulting from failure of a water conveyance structure.
- 2.6.34a Water conveyance structures authorized on the SJNF or TRFO should allow for the passage of aquatic organisms if there is the potential to obstruct such passage to potential or occupied habitat.
- 2.6.34b Headgates should contain measurement devices that can be used to determine compliance with land use authorization permits.
- 2.6.35 As a general practice non-toxic fluid, additives, and other materials should be used for well drilling to protect surface water and groundwater quality.
- 2.6.36 Exploration and production waste should be disposed of using BMPs that meet state regulations and specific BLM or USFS requirements. Exploration and production waste should be disposed of in such a manner as to not to inhibit reclamation success of the site.
- 2.6.37 Operators should use proven technologies for the recycling of fresh water, drilling fluids, and produced water for reuse in drilling and completion operations or other beneficial purposes whenever possible.
- 2.6.38 As individual fields are developed, centralized liquid gathering systems should be used for the delivery and gathering of drilling, completion, and produced fluids such as fresh water, waste/produced water, and condensate.
- 2.6.39 Water Use and Disposal Management Plans should be included in Plans of Development for fluid minerals projects and solid minerals projects.

- 2.6.40 Ground disturbance, facilities construction, and incompatible land management activities (those activities that may pose a risk of impacting water quality) on SJNF lands should be prohibited on lands within 1,000 horizontal feet of either side of a classified surface water supply stream segment (as measured from the average high water mark of a water body) for a distance of 5 miles upstream of public water supply intakes for towns, cities, and municipalities. These activities should also be prohibited within a minimum distance of 1,000 horizontal feet for source water protection areas for towns, cities, and municipalities using a groundwater well or spring.

### **Additional Guidance**

- The Colorado River Basin Salinity Control Act of 1974
- the Clean Water Act of 1977
- EO 11288, 1966
- EO 11752, 1973
- EO 11988, 1977
- EO 11990, 1977
- FSM 2500
- FSH 2500
- MOU between the Colorado Department of Natural Resources and the USFS, 2004
- MOU between the Colorado Department of Natural Resources, the Colorado Water Conservation Board, and the BLM, 2005
- Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development (2007)
- FSH 2509.13, Burned Area Emergency Rehabilitation
- National Best Management Practices for Water Quality Management on National Forest System Lands, Volume 1: National Core BMP Technical Guide (USFS 2012b)
- MOU between the Colorado Department of Public Health and Environment (CDPHE) and the USFS (USFS 2009a)
- USFS BMPs in FSM 2532 and FS 2509.19
- Region 2 Watershed Conservation Practices Handbook (Region 2 FSH 2509.25-2006-1)

## **2.7 Livestock and Rangeland Management**

### **Introduction**

Livestock grazing initially began in the 1880s to support local mining operations and take advantage of the natural grasslands. As the rate of homesteading increased, and other laws designed to increase the rate of western settlement were passed, livestock numbers on public lands increased. With the creation of the SJNF in 1906, federal livestock management was directed toward allocating forage to local dependent users. With the passage of the Taylor Grazing Act in 1934, the same approach was continued on BLM public lands (and the days of the open range came to an end).

Generally, rangeland management activities from the 1940s through the late 1980s were directed toward improving watershed conditions in the West through the use of large amounts of capital and new technology. Rangeland management practices designed to accomplish these goals included increased water development, fencing, brush control practices, reseeding, and the use of intensive grazing systems. It was generally believed that this prescriptive approach would meet management objectives.

From the late 1980s to the present, rangeland management activities have been directed toward improving rangelands through adaptive management. Factors including the increase in big game numbers, the listing of threatened and endangered species, the implementation of hazardous fuels reduction projects, ongoing drought, and persistent water quality issues have all added to management challenges.

Cattle numbers peaked in the 1920s; sheep numbers peaked in the 1930s. Currently, livestock numbers are at 50% and 5%, respectively, of their historic highs. Market factors, administrative actions, and an ongoing drought have all contributed to the USFS and the BLM not meeting planned levels for permitted use in the past few decades.

## **Rangeland Planning**

Management decisions and their associated NEPA analyses identify grazing actions, the need for rangeland improvements required to implement a proposed action, appropriate mitigation measures, and necessary monitoring activities so that outcomes trend towards the desired conditions listed below. Adaptive management tools should be used to improve on-the-ground management and respond to changing conditions so that desired conditions are met. Per current policy, NEPA compliance should be completed on all active BLM and USFS allotments (as guided by BLM permit renewal schedules and the USFS Rescissions Act of 1995). In addition, periodic reviews of analyses and decisions should be conducted in order to ensure that NEPA-based decisions stay current and sustainable for all permitted livestock grazing.

Management decisions, based on NEPA analyses, may result in the modification and/or development of new AMPs. New AMPs should be completed within 1 year of a grazing decision. Vacant allotments not initially analyzed under Rescissions Act planning or as part of a decision to issue a grazing permit will be evaluated over the implementation life of the LRMP in order to determine their value for restocking, use as forage reserves, altering management, or closure and dedication to other uses or values.

## **Rangeland Monitoring**

Implementation monitoring, or annual short-term monitoring, determines whether guidelines and management practices are implemented. This will include, but is not limited to, annual allotment monitoring in order to determine if utilization guidelines have been achieved, range improvements have been constructed and/or maintained to standards, actual use has been reported by grazing permittees, and pasture rotations have been followed. Effectiveness monitoring will help managers evaluate whether desired conditions are being achieved. Validation monitoring will help managers evaluate whether the information upon which guidelines and objectives are based is valid and correct. On-the-ground indicators identified in the Colorado State Public Land Health Standards (BLM 1997) are a frame of reference for determining whether management changes are necessary on public lands. Grazing allotments undergoing NEPA analysis, and effectiveness monitoring on grazing allotments with a current grazing decision, will be monitoring priorities. Annually, effectiveness monitoring will be conducted on at least 10% of active SJNF allotments. All allotments will be monitored on a rotating basis. Monitoring information will be used to make management changes using adaptive management principles. The TRFO will use the BLM Assessment, Inventory and Monitoring Strategy (BLM 2012a) to plan and implement rangeland monitoring. The objectives of the Assessment, Inventory and Monitoring Strategy are to establish a scientifically based quantitative process for describing and reporting on the trend and condition of public lands and to report on the effectiveness of the BLM's management decisions and actions. The strategy outlines a process for developing new inventory or monitoring activities and provides a standard to evaluate ongoing monitoring activities.

## **Range Improvements**

Range improvement projects (including fences, water developments, vegetation improvement projects, etc.) will be implemented, as necessary, in order to move the program toward desired conditions and/or address other resource concerns. These projects will be described and authorized in site-specific NEPA analyses. Range improvements will be prioritized in AMPs based on resource objectives. Per agency policy, prior to implementing projects that require temporary changes to current livestock management (e.g., seeding, prescribed fire, fuel reduction projects), range permittees on the SJNF will receive at least 1 year's notice, and 2 years notice for permittees on TRFO lands. Range betterment funds on SJNF lands are used for projects within range allotments. Grazing allotments with current NEPA decisions should be given the highest priority when considering the use of range betterment funds. Where range improvement projects benefit multiple resources, other funding sources should be considered to complete the project in addition to range betterment funds.



## Suitability and Availability of Lands for Livestock Grazing

The NFMA and the 1982 USFS planning regulations require that NFS lands be identified as suitable or unsuitable for livestock grazing. The BLM Land Use Planning Handbook requires that BLM lands be identified as available or unavailable for livestock grazing. Using the processes described in the BLM's Land Use Planning Handbook and the USFS Region 2 Desk Guide, a suitability analysis was conducted for all TRFO and SJNF lands. It provides a determination of areas generally suitable and capable for livestock grazing. Availability of allotments on TRFO lands was determined based on the suitability analysis.

For TRFO lands, 388,202 acres are available for cattle grazing, and 31,973 acres are available for sheep. For SJNF lands, 689,628 acres are suitable for cattle, and 183,733 acres are suitable for sheep. There are also a total of 21,152 available animal unit months (AUM) for cattle on TRFO lands, and 2,073 AUMs for sheep (a determination of available AUMs is not required on USFS lands because AUMs under term-grazing permits are determined on an allotment-by-allotment basis; therefore, they can vary according to management, rangeland condition, and trend).

Figures 2.7.1 and 2.7.2 depict lands suitable for livestock grazing across the planning area, and Figure 2.7.3 depicts availability, status and stocking rates on SJNF and TRFO grazing allotments. Volume III, Appendix L lists TRFO grazing allotments available for livestock grazing as well as permitted AUMs by allotment.

## Desired Conditions

- 2.7.1 Rangeland provides forage for qualified local livestock operations and helps ranches remain sustainable and intact.
- 2.7.2 Rangelands and permitted livestock grazing use contribute to the maintenance of large open spaces on private lands.
- 2.7.3 Permitted livestock grazing fee collections contribute to the local county fund base for roads, schools, and range improvements.
- 2.7.4 Rangelands provide healthy and sustainable habitat for wildlife populations that, in turn, support recreational hunting, fishing, and/or viewing (thereby contributing to the local and regional economy).
- 2.7.5 Rangelands provide diverse, healthy, and sustainable plant communities and conserve soil quality.
- 2.7.6 Suitable rangelands on SJNF lands are meeting desired conditions of affected resources.
- 2.7.7 The abundance and distribution of native grasses in semi-desert grasslands, sagebrush shrublands, pinyon-juniper woodlands, and semi-desert shrublands do not decrease due to livestock grazing management.
- 2.7.8 Rangeland management maintains or increases the abundance and distribution of Arizona fescue in ponderosa pine forests.

## Objectives

- 2.7.9 Annually administer at least 25% of active SJNF and TRFO (improve and maintain category) grazing allotments to standard on a priority basis ensuring that all active grazing allotments during the life of the LRMP receive appropriate administration. Work with grazing permittees and peers to resolve livestock grazing management issues. Take appropriate administrative action as needed to improve livestock grazing management.
- 2.7.10 Within 15 years, working with partners and cooperators, reconstruct 25% of priority structural range improvements on SJNF lands in order to maintain infrastructure integrity.

## **Standards**

### ***Livestock Management***

- 2.7.11 Grazing permit administration in occupied bighorn sheep habitat must utilize measures to prevent physical contact between domestic sheep and bighorn sheep. Permit administration actions may include but are not limited to use of guard dogs, grazing rotation adjustments, or relocation of salting and bed grounds.
- 2.7.12 Management of domestic sheep must utilize measures to prevent physical contact with bighorn sheep.

### ***Rangeland Vegetation***

- 2.7.13 Project-level NEPA analysis and decisions, and the resultant AMPs, must identify key herbaceous and woody plant species and their respective utilization guidelines.
- 2.7.14 Project-level design must incorporate habitat needs to satisfy MIS desired conditions and objectives within USFS grazing allotments.

## **Guidelines**

### ***Livestock Management***

- 2.7.15 Land managers should phase out grazing systems that allow for livestock use in an individual unit during the entire vegetative growth period (season-long), except where such management has been determined to be able to achieve or maintain desired conditions.
- 2.7.16 If grazing privileges are relinquished or cancelled on SJNF or TRFO lands where fragile soils, low forage production, low livestock water availability, and/or conflicts with other resources make livestock grazing undesirable, the privileges should not be re-allocated.
- 2.7.17 Prior to allocating grazing privileges for a new grazing permittee on unallocated grazing allotments, the needs of existing rangeland management, as well as ecological diversity and species viability, should be considered.
- 2.7.18 Grazing systems should be designed in a manner to provide periodic rest to forage species during the critical growing season in order to promote species diversity, reproduction, and productivity.
- 2.7.19 Livestock grazing should be avoided during the same time, and in the same place, in consecutive years on NFS lands.
- 2.7.20 When designing a grazing plan, ongoing and potential forage and browse competition among livestock, big game, and wild horses should be considered.
- 2.7.21 The designation of grazing allotments to be used as forage reserves should be considered when grazing privileges terminate, if such designations would improve land management as well as livestock management opportunities.
- 2.7.22 Grazing management activities should be modified in, or livestock excluded from, riparian areas that are “nonfunctional” or “functional-at risk” with a downward trend (as rated by the Proper Functioning Condition protocol), where livestock have been determined to be a key causative agent.
- 2.7.23 Trailing of livestock should be avoided along riparian areas to the extent practicable.
- 2.7.24 Rangeland management should incorporate measures to conserve soil quality.

- 2.7.25 The BLM should consider closing custodial allotments when term grazing permits expire where public lands cannot be properly managed due to the subdividing of surrounding base property, or due to insufficient or livestock water availability, access, management flexibility, and/or lack of capable rangeland.

### **Rangeland Vegetation**

- 2.7.26 Vegetation management planning should emphasize restoration needs in the sagebrush ecosystem type.
- 2.7.27 Livestock should be moved from the grazing unit or allotment when utilization guidelines on key areas are met or exceeded, as identified in Table 2.7.1, or as specified in a NEPA decision for the particular allotment's AMP or annual operating instructions.

**Table 2.7.1: Allowable Use Guidelines by Livestock Grazing Management System**

Management System	Allowable Forage Utilization Guideline*
Season-long	30%
Rotation	45%
Deferred rotation	50%
Rest rotation	50%
* Utilization percentages are expressed in terms of annual forage production present at the time the livestock leave the area and are generally a measurement of designated key species on key areas.	

- 2.7.28 The residual riparian vegetation guidelines, as shown in Table 2.7.2, should be met or exceeded at the time the livestock leave the pasture/allotment.

**Table 2.7.2: Post-grazing Vegetation Heights under Different Seasons of Use in Riparian Areas and Wetlands**

Season of Use	Residual Riparian Vegetation Height*
Season-long (i.e., no regrowth potential)	6 inches
Early growing season (i.e., significant regrowth potential)	3 inches
Mid-season (i.e., limited regrowth potential)	4 inches
Late season (i.e., little to no regrowth potential)	4–6 inches
Late fall and winter (i.e., dormant season use)	6 inches
* Maximum riparian and wetland allowable use (residue) guidelines to be applied on key sedge or rush species. For riparian areas lacking sedge and/or rush species, use existing herbaceous vegetation utilization guidelines. Consider the duration livestock has access to key areas when setting allowable use guidelines—the shorter the duration, the less the opportunity for repeat grazing of individual plants.	

- 2.7.29 Allowable use, residual vegetation, and other grazing guidelines apply to wildlife, livestock, and wild horses. If allowable use guidelines are exceeded, reductions to livestock forage utilization levels, wild horse numbers, or recommendations for reductions in wildlife numbers should be made.
- 2.7.30 Based on vegetation type, sheep grazing should be planned to reflect moderate use after grazing. Where appropriate, such as areas outside the aspen-forb type, forage should show that it has

been topped and selectively grazed; trampling should be minimal and trailing may be evident, but not common. Within the aspen-forb type trampling and trailing may be evident, but day bedding close to water, as well as well as trailing to and from water, should not be evident.

### ***Range Improvements***

- 2.7.31 Project planning should consider the need to retreat non-structural range improvements.
- 2.7.32 Livestock grazing use should be deferred following vegetation treatments, such as prescribed fire or wildfire, until recovery objectives are met or it is demonstrated that such use would not be detrimental.
- 2.7.33 Where appropriate, and where the appropriate kind and class of livestock are available, livestock grazing should be considered as an invasive species management tool.
- 2.7.34 Wildlife needs should be considered in the design of structural and non-structural range improvements.
- 2.7.35 Livestock grazing on lands proposed for disposal should not be re-authorized after current term grazing permits expire, unless disposal will not occur within the term of the new permit.

### **Additional Guidance**

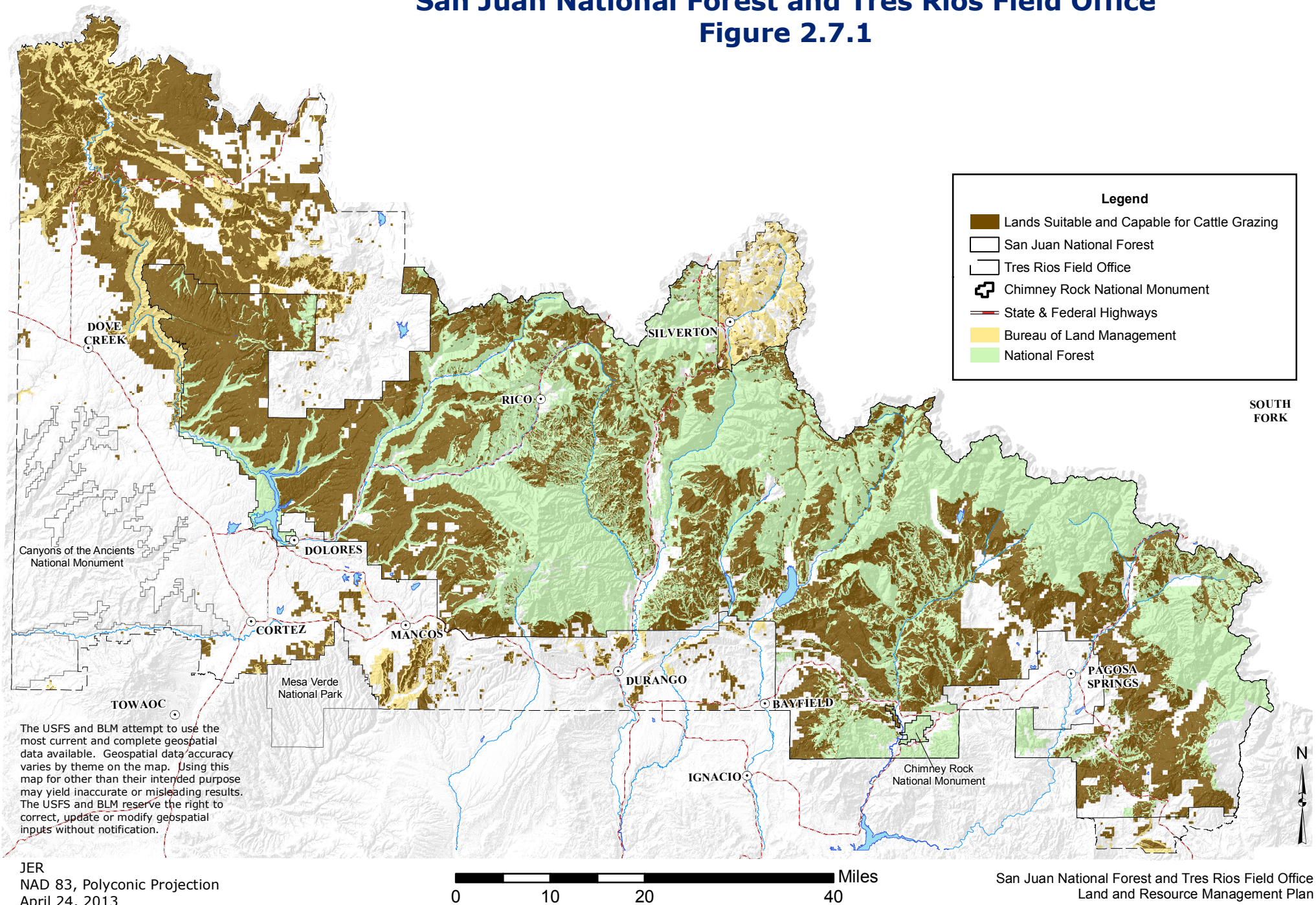
- Taylor Grazing Act of 1934, as amended
- Public Rangelands Improvement Act of 1978
- Multiple-Use/Sustained-Yield Act of 1960
- Wilderness Act of 1964, Section 4(4)
- Section 504 of the Rescissions Act of 1995
- Consolidated Appropriations Resolutions, 1999–2003
- Colorado Public Land Health Standards EA and Finding of No Significant Impact (FONSI), 1997
- 43 CFR 4100 and 36 CFR 222 Subpart A
- FSM 2200
- FSM 1950
- FSH 1905.15, Environmental Policy and Procedures Handbook
- FSH 1909.17, Economic and Social Analysis Handbook
- FSH 2509.13, Burned Area Rehabilitation Handbook
- FSH 2509.25, Watershed Conservation Practices Handbook
- FSH 2409.19, Renewable Resource Uses for Knutson-Vandenberg (K-V) Fund Handbook
- FSH 2109.13, Grazing Permit Administration Handbook
- USFS Rocky Mountain Region Rangeland Analysis and Management Training Guide (USFS 1996a)
- Interagency Technical References
- BLM Handbook 4180-1, Rangeland Health Standards
- BLM Handbook 4120-1, Grazing Management
- BLM Handbooks 4010 and 4010-1, Range Management Program Records
- BLM Handbook 4110-1, Qualifications and Preference
- BLM Handbook 4160-1, Administrative Remedies
- BLM Handbook 4400, Rangeland Inventory, Monitoring, and Evaluation
- BLM Handbook 4150-1, Unauthorized Grazing Use
- BLM Handbook H-1790-1, NEPA Handbook
- Various BLM IMs and Informational Bulletins relating to rangeland administration and management



# Lands Suitable and Capable for Cattle Grazing

## San Juan National Forest and Tres Rios Field Office

### Figure 2.7.1

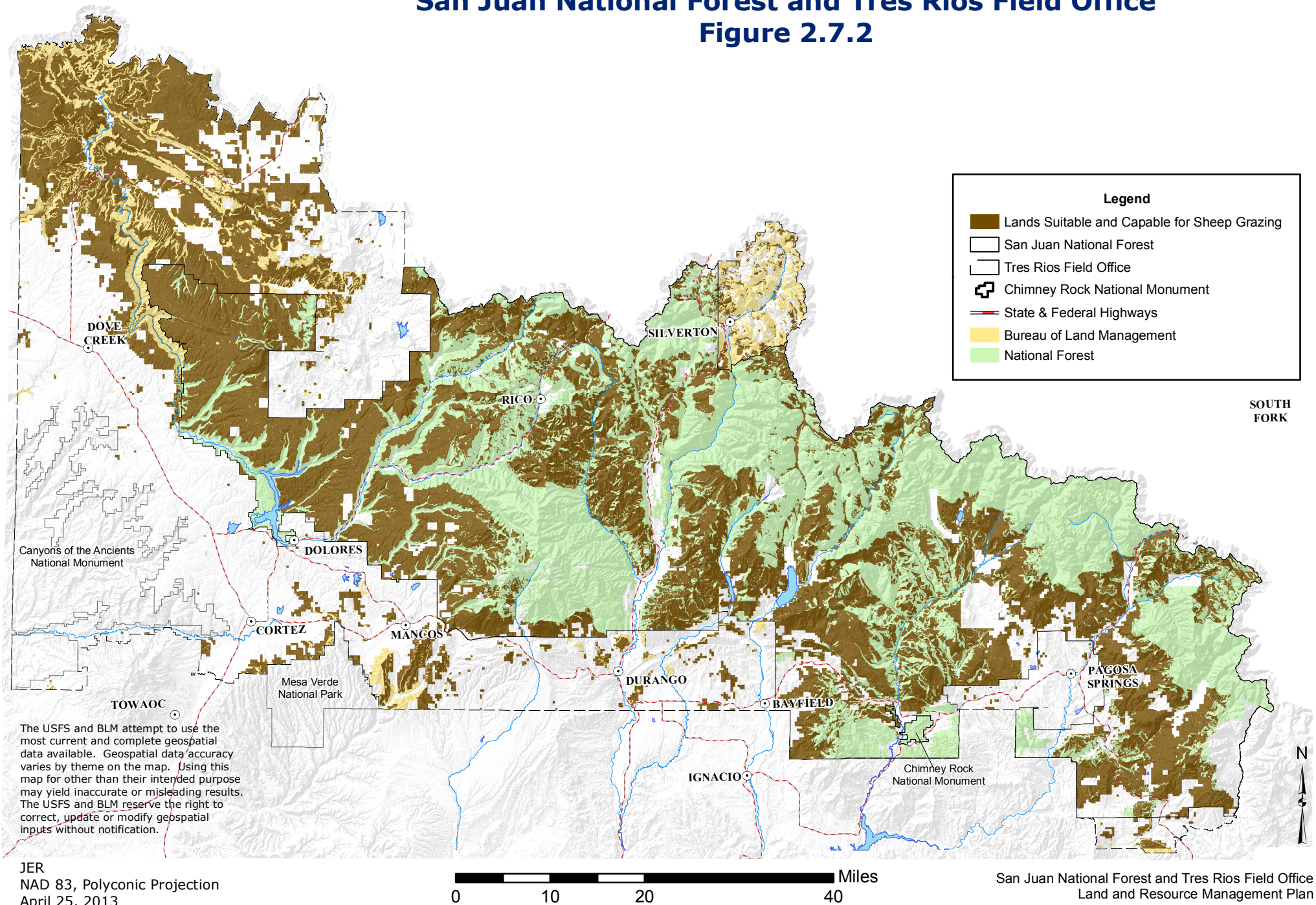




# Lands Suitable and Capable for Sheep Grazing

## San Juan National Forest and Tres Rios Field Office

### Figure 2.7.2

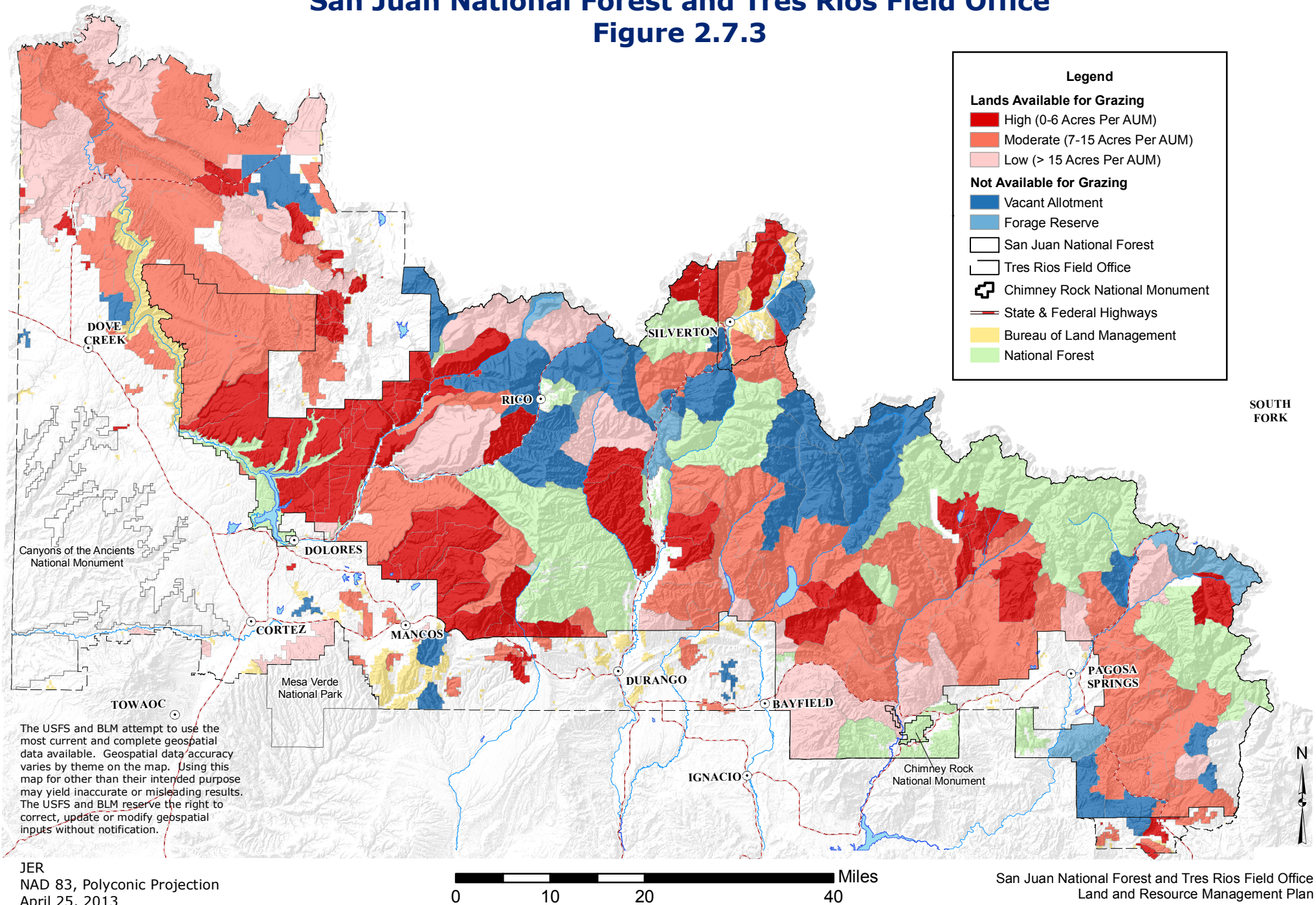




# Available Grazing Allotments and Comparative Stocking Rates

## San Juan National Forest and Tres Rios Field Office

### Figure 2.7.3



## **2.8 Invasive Species**

### **Introduction**

Within the planning area, invasive plants are currently managed in accordance with an Invasive Species Action Plan (USFS and BLM 2012). This plan, which covers a 3- to 5-year time frame, lists prevention practices, early detection and rapid response strategies, and priority inventory and treatment areas. All resource areas participate in invasive species management within the planning area. Invasive terrestrial wildlife species, as well as aquatic invasive species, have the potential to out-compete native species using similar niches within the ecosystem. These changes may result from influences to the biotic (relating to, produced by, or caused by living organisms, such as plant or animal) and abiotic (non-living chemical and physical factors in the environment, such as soils, hydrology, etc.) components of the ecosystem. The resulting changes may allow invasive species to directly or indirectly impact the native species and their related ecosystems.

Invasive species move across jurisdictional boundaries and property lines; therefore, LRMP implementation will involve close coordination and partnerships with local, state, other federal agencies, and tribal governments; as well as with interested organizations and individuals. Partners and contractors will be considered when implementing invasive treatment activities.

Coordination with CPW when addressing aquatic invasive species is particularly important. The USFS and BLM will cooperate with CPW to regularly determine the extent of aquatic invasives populations, develop prevention and early detection efforts, and develop appropriate management plans to eradicate or manage invasive aquatic species.

It is equally important that special use permittees and other permittees be made aware of prevention and mitigation measure regarding aquatic invasive species. In addition, Resource Advisors should also be able to provide Incident Management Teams with local, site-specific information addressing aquatic invasive species locations and appropriate mitigation measures.

### **Desired Conditions**

- 2.8.1 Invasive species management is coordinated with adjacent landowners.
- 2.8.2 Federal lands have a transportation system composed of specific roads and trails that do not contribute to the spread of invasive species along travel corridors.
- 2.8.3 Invasive species, both terrestrial and aquatic, are absent or rare within the planning area, and are not influencing native populations or ecosystem function.
- 2.8.4 Invasive species are not introduced or spread within protected areas.
- 2.8.5 Management activities do not contribute to the spread of invasive annual plants or other invasive species.

### **Objectives**

- 2.8.6 Within 15 years, contain priority Class B invasive species on TRFO and SJNF lands identified in the Invasive Species Action Plan.
- 2.8.7 Within 15 years, increase annual treated acres of noxious weeds to 10% of known acres infested on TRFO and SJNF lands.
- 2.8.8 Within 15 years, annual backcountry treatment (including wilderness areas and WSAs) is 10% to 15% of the total annual noxious weed treatment target on SJNF and TRFO lands.



- 2.8.9 Over the life of the LRMP eradicate newly established invasive species especially Colorado Class A noxious species on both SJNF and TRFO lands.

## **Standards**

- 2.8.10 Projects or activities that would authorize the use of forage products must use certified noxious weed seed-free forage products.
- 2.8.11 Invasive species must be managed using integrated weed management principles.
- 2.8.12 The SJNF and TRFO must include provisions that are necessary to prevent the spread of and to control the introduction of invasive species in contracts and permits for use of SJNF and TRFO lands and resources.

## **Guidelines**

- 2.8.13 Cleaning facilities and associated educational materials should be developed for boating areas in cooperation with CPW or other state and local regulatory agencies.
- 2.8.14 Wildland fire operations should follow direction provided in Interagency Standards for Fire and Fire Aviation Operations (NFES 2724; USFS et al. 2013) under the Operational Guidelines for Aquatic Invasive Species section to prevent the introduction and spread of aquatic invasive species.
- 2.8.15 Project planning and implementation should consider the need to prevent the introduction and spread of aquatic invasive species. The SJNF and TRFO Invasive Species Action Plan (USFS et al. 2012) provides a useful reference for appropriate management and mitigation measures.
- 2.8.16 High risk aquatic invasive species areas should be a priority for inventory and monitoring activities.
- 2.8.17 Proper equipment (e.g., vehicles, waders), cleaning techniques, and chemicals should be used as necessary to prevent the spread and establishment of aquatic invasive species.
- 2.8.18 For all proposed projects or activities, the risk of invasive aquatic and plant species introduction or spread should be determined and appropriate prevention and mitigation measures implemented.

## **Additional Guidance**

- EO 13112
- Carson-Foley Act of 1968
- Federal Noxious Weed Act of 1974
- Public Rangelands Improvement Act of 1978
- Plant Protection Act of 2000
- Healthy Forests Restoration Act of 2003
- Wilderness Act of 1964, Section 2 (c)
- Federal Insecticide, Fungicide, and Rodenticide Act of 1972
- Cooperative Forestry Assistance Act of 1978
- Resource Conservation and Recovery Act of 1976
- CERCLA
- Management and Control of Noxious Plants on the San Juan/Rio Grande National Forests, Decision Notice and FONSI (USFS 1996b)
- BLM Vegetation Treatments Using Herbicides Final Programmatic EIS Record of Decision (BLM 2007a)
- Integrated Weed Management Plan (CO-800-2008-075 EA) (BLM 2011c)
- FSM 2200

- FSM 2080
- BLM Manual 9015
- FSH 2109.14, Pesticide Use-Management and Coordination Handbook
- FSH 2509.13, Burned Area Rehabilitation Handbook
- FSH 2509.25 Watershed Conservation Practices Handbook
- FSH 2409.19, Renewable Resource Uses for Knutson-Vandenberg (K-V) Fund Handbook
- Rules Pertaining to the Administration and Enforcement of the Colorado Noxious Weed Act (8 CCR 1203-10)
- USFS National Strategy and Implementation Plan for Invasive Species Management (FS-805-2004) (USFS 2004f)
- USFS Guide to Noxious Weed Prevention Practices (Version 1.0) (USFS 2001b)
- BLM Partners Against Weeds (BLM 1996)
- Various BLM IMs and Information Bulletins relating to noxious weed management and pesticide use

## 2.9 Timber and Other Forest Products

### Introduction

This section is focused primarily on timber management on NFS lands and ties to USFS regulations. Information applicable to BLM lands is specifically noted.

The timber management program on the SJNF has followed the trend of many other national forests with regard to harvest levels. The SJNF was a source for timber products to meet demand early in the twentieth century in support of mining and settlement, with another spike in harvesting following World War II. The highest harvest levels occurred in the early 1970s when 50 to 75 million of board feet (MMBF) of timber were sold annually. Since that time, harvesting levels have continued to decline, and many larger local mills have closed. Annual timber sales recently have averaged about 10 MMBF. The planning area includes aspen, which has been actively managed since the 1940s. There is currently not an active commercial timber program on the BLM lands within the planning area; however, non-commercial products (including post and poles, Christmas trees, and other non-forest products) are available.

The forest products industry continues to be very important to communities near the planning area. Currently, several wood processing facilities are located in Montezuma County, including Western Excelsior Corporation, Aspen Wall Wood, and the Stoner Top Sawmill. A new facility is under design, expected to be constructed in the Pagosa Springs area in 2013–2014, to process wood chips and mill cants. These facilities use/will use a variety of products (sawtimber, poles, miscellaneous biomass) and species (various conifer and aspen). Although the level of timber harvesting has declined in the past decade, ecologically based desired conditions in forested areas are, in large part, dependent on the timber program and the capacity of the timber industry to change vegetation conditions. Without the timber industry, the ability to manage vegetation would be significantly reduced. Commercial timber harvesting is an important tool for managing vegetation on the SJNF, and forest product firms provide economic balance to their respective communities.

There are many opportunities for vegetation management and for meeting the demand for products by wood-processing industries. However, the feasibility of these opportunities depends on future program levels and on forest products industry capacity and market demand. The timber program across both SJNF and TRFO lands will focus treatment in:

- landscapes in the WUI that have altered fire regimes and/or have areas with high fuel loadings;
- landscapes at high risk for developing epidemic levels of insect and/or disease infestation;
- landscapes where disturbance (such as fire, or insects/disease) has resulted in dead or dying trees;

- areas where vegetation management could most effectively move age classes, size classes, density, and species closer to desired conditions;
- areas treated previously in order to maintain sustainable conditions and improve scenic integrity; and
- areas where wood processing facilities can effectively and economically utilize products resulting from vegetation management.

Strategies to meet forest vegetation management objectives across the SJNF and TRFO include:

- utilization of forest resources from vegetation management activities, including providing small-diameter and biomass products from treatments in order to support emerging biomass markets;
- trees killed by fire, insects, disease, or weather events (such as wind-thrown trees);
- a balance of forest product quantity, size, species and quality in order to maintain forest products industry capacity at current or higher levels;
- integration of the timber and fuels programs to meet overlapping or common goals; and
- a combination of legal authorities and partnerships to broaden opportunities for meeting forest vegetation objectives, in priority landscapes or areas, with cost-effective treatments.

## Timber Product Outputs

The Timber Sale Program Quantity (TSPQ) is an estimate of annual average output of timber from the SJNF during the first decade under this LRMP based on expected budget levels, industry capacity, and other public and resource objectives. The intent is to provide a stable, predictable, and sustainable supply of wood that will contribute to a stable, sustainable, and diverse forest products industry, while concurrently meeting public demand for fuelwood and other objectives for vegetation management. The TSPQ is a combined program of timber management treatments from USFS lands designated as “Suitable for Timber Production” and other lands. Table 2.9.1 presents the volumes to be offered for sale, summarized by conifer and aspen..

The SJNF has a program of vegetation management in which timber sales are offered based on capability determined by the LTSYC, which is defined as the highest uniform wood yield that may be sustained under specified management intensities consistent with multiple-use objectives after stands have reached desired conditions. The LTSYC for both “Lands Suitable for Timber Production” and other lands are displayed in Table 2.9.2.

**Table 2.9.1: Estimated Volume Produced by the Timber Sale Program Quantity on San Juan National Forest Lands, Annual Average in the First Decade**

TSPQ	Lands Suitable for Timber Production				Other Lands				Total	
	Sawtimber		Products other than Logs		Sawtimber		Products other than Logs			
	MMCF	MMBF	MMCF	MMBF	MMCF	MMBF	MMCF	MMBF	MMCF	MMBF
Aspen			1.12	5.61			0.12	0.59	1.24	6.20
Conifer	1.05	5.26			0.07	0.36			1.13	5.63
Total									2.37	11.83

MMCF = million cubic feet.

**Table 2.9.2: Estimated Annual Long-Term-Sustained-Yield Capacity on San Juan National Forest Lands, Annual Average**

	Lands Suitable for Timber Production		Other Lands	
	MMCF/Year	MMBF/Year	MMCF/Year	MMBF/Year
LTSYC	8.54	35.55	1.82	7.03
Allowable Sale Quantity	4.0	19.9		
MMCF = million cubic feet.				

## Timber Suitability

Timber suitability is determined through a process established through the NFMA and planning regulations. This process first identifies lands not suitable for harvest by excluding areas where 1) site conditions preclude tree cover, 2) harvest is prohibited by statute or regulation (e.g., wilderness), 3) irreversible resource damage could occur from timber harvest (e.g., steep or unstable slopes), and 4) adequate restocking, with trees, following harvest is not assured. The SJNF contains 1,157,816 acres not suitable for timber production, and the TRFO contains 476,323 acres not suitable. Lands remaining after this exclusionary process are deemed “tentatively suitable.” These remaining lands are broken into two classes: 1) lands suitable for timber production (“suitable timberlands”) and 2) “other tentatively suitable lands where timber harvest may occur” for multiple-use objectives other than timber production. The SJNF contains 311,949 acres of suitable timberlands, and 395,067 acres of other tentatively suitable lands where timber harvest may occur. The TRFO contains no suitable timberlands, but does contain 27,309 acres of other tentatively suitable lands where timber harvest may occur. Figure 2.9 displays these areas.

## Desired Conditions

- 2.9.1 Forest vegetation management on SJNF and TRFO lands that results in, among other objectives, meeting needs or demands for forest product offerings (commercial, personal, or other use) is done in a manner that:
- maintains or improves ecosystem function, resilience, and sustainability;
  - supports, at least, the current level of economic activity in the local timber industry;
  - provides economic or social support to local communities;
  - ensures current and future needs for Native American tribal use, including that associated with special forest products (e.g., teepee poles);
  - utilizes, to the fullest extent practicable, potential products including sawtimber, poles, topwood, or slash (e.g., limbs, foliage);
  - supports innovation in utilization, including conversion of cut-tree mass into biofuels, pellets, biochar, or other useful products;
  - efficiently balances or reduces costs of implementation of treatment activities; and
  - anticipates climate-related plant succession changes (such as favoring heat- or drought-resistant tree species as leave trees, or in reforestation).
- 2.9.2 SJNF lands classified as “suitable” for timber production have a regularly scheduled timber harvesting program (see Figure 2.9).
- 2.9.3 SJNF lands classified as “not suitable” for regularly scheduled timber production (but where timber harvesting could occur for other multiple-use purposes) have an irregular, unscheduled timber harvesting program (see Figure 2.9).
- 2.9.4 Reforestation activities on SJNF and TRFO lands use native tree species germinated from locally collected seed stock to improve the resiliency of forest ecosystems.

## Objectives

- 2.9.5 The most common applications of timber harvest, to meet desired conditions, will include:
- 2.9.5a Within 10 years, conduct thinning—with an emphasis on restoration and fuels reduction of altered forest types—in the ponderosa pine and warm-dry mixed conifer vegetation types on approximately 15,000 to 20,000 acres of SJNF lands.
  - 2.9.5b Within 10 years, emphasize selection harvests in cool-moist mixed conifer and spruce-fir vegetation types on approximately 2,500 to 5,000 acres of SJNF lands and 200 to 300 acres of TRFO lands.
  - 2.9.5c Within 10 years, utilize coppice harvest (clearcuts with regeneration by sprouting) in aspen and cool-moist mixed conifer forest types on approximately 4,000 to 5,000 acres of SJNF lands.
- 2.9.6 Meet or exceed average annual timber product offerings from SJNF lands to local timber industries, publics, and other users (including Native Americans), as displayed in Tables 2.9.1 and 2.9.2 above, over the life of the LRMP.
- 2.9.7 Every 3 years evaluate utilization of forest products from SJNF or TRFO contracts and permits that result in product sales or usage, including biomass.
- 2.9.8 Every 3 years compare, contrast, and evaluate costs of implementation of timber management projects.
- 2.9.9 Every 3 years review silvicultural prescriptions for incorporation of strategies that anticipate potential plant succession changes relative to warmer and/or drier forested conditions.
- 2.9.10 Every 10 years assess timber suitability for forested lands on the SJNF.
- 2.9.11 Annually review seed inventories to ensure adequate seed from locally collected native tree species is available for planned reforestation activities on SJNF and TRFO lands.

## Standards

- 2.9.12 Regulated timber harvest activities will occur on only those SJNF lands classified as "suitable" and "scheduled" for timber production. On unsuitable or suitable but not scheduled lands, limited timber cutting may occur for such purposes as salvage, protection or enhancement of biodiversity or wildlife habitat, scenic-resource management, or research or administrative studies consistent with Management Area (MA) direction.
- 2.9.13 Timber will be harvested from suitable for production SJNF lands only where there is assurance lands can be adequately restocked within 5 years after harvest. No minimum seedling height requirements are specified. Seedlings must have survived a minimum of 1 year and be expected (on the basis of research and experience) to be able to produce the desired future stand condition specified for this area in the forest plan. The number of seedlings in Table 2.9.3 represents the minimum number of seedlings required, considering natural mortality, to produce a merchantable timber stand at rotation age without intermediate treatments for even-aged management on lands scheduled for timber production. Silvicultural prescriptions must specify the minimum stocking requirements for uneven-aged management, or regeneration harvests on lands not scheduled for timber production, to achieve appropriate forest cover.

**Table 2.9.3: Minimum Number of Seedlings (or aspen suckers) for Adequately Restocking of a Regeneration Site**

<b>Vegetation Type</b>	<b>Minimum Numbers of Seedlings (per acre)</b>
Spruce-fir	150
Aspen	300

Vegetation Type	Minimum Numbers of Seedlings (per acre)
Mixed conifer	150
Ponderosa pine	150

2.9.14 The silvicultural systems shown, by forest vegetation type in Table 2.9.4, that meet the management objectives for the landscape or individual stands of trees within a landscape setting are acceptable. Both even- and uneven-aged management systems can be used and applied at scales ranging from a few acres to many hundreds of acres. These silvicultural systems are to be applied in a manner that will ensure natural regeneration where artificial regeneration is not necessary for other resource objectives. Tree-stand vegetation management treatments must be approved by certified silviculturists.

**Table 2.9.4: Appropriate Silvicultural Systems by Forest Vegetation Type**

Forest Vegetation Type	Even-aged	Two-aged	Uneven-aged
Ponderosa pine	Shelterwood; seed tree	Irregular shelterwood	Group selection; single-tree selection
Warm-dry mixed conifer	Shelterwood; seed tree	Irregular shelterwood	Group selection; single-tree selection
Cool-moist mixed conifer	Shelterwood; clearcut seed tree	Irregular shelterwood	Group selection; single-tree selection
Aspen with conifer	Shelterwood; clearcut; coppice *	Irregular shelterwood; coppice with standards **	Group selection; single-tree selection
Aspen	Coppice	Coppice with standards	Group Selection
Engelmann spruce – subalpine fir	Shelterwood	Irregular shelterwood	Group selection; single-tree selection
*Clearcut, if intent is to regenerate with conifer; coppice (vegetative reproduction with “clear felling” to stimulate aspen sprouting from residual roots) if the intent is to regenerate aspen.			
**Standards are selected overstory trees reserved for a longer rotation at the time each crop of coppice material is cut.			

2.9.15 The maximum size of openings created by even-age management on SJNF lands will be 40 acres, regardless of forest type, with the following exceptions:

- proposals for larger openings may be approved by the Regional Forester, subject to a 60-day public review;
- where larger openings are the result of natural catastrophic conditions (including those resulting from fire, insect or disease attack, or windstorm); or
- where the area that is cut does not meet the definition of created openings.

2.9.16 Artificially created openings on SJNF lands will no longer be considered openings when the trees reach a height and density that meets management objectives. The default criteria are when the minimum stocking standards for the forest vegetation type are met and the average height is 6 feet or greater with at least a 70% distribution for conifer species and 10 feet or greater with at least a 70% distribution for aspen. The criteria will be validated and may be modified based upon local conditions encountered during implementation. Criteria to consider in determining when an opening is no longer an opening include:

- visual sensitivity of the area;
- the character of the landscape;
- the abundance, quality, and need for cover for big game animals;
- other vegetation that may be present (such as tall shrubs);
- forest health;
- the need for seed sources;
- the need for interior forest area;
- the production of wood fiber; and

- watershed and riparian area protection.

## Guidelines

- 2.9.17 Table 2.9.5 shows the acceptable types of stand improvements and regeneration methods that should be used in a given forest vegetation type in order to meet the management objectives for the landscape and/or for individual stands of trees within a landscape setting.
- 2.9.18 Regeneration harvests of even-aged timber stands (sites) on SJNF lands should not be undertaken until the stands have generally reached or surpassed 95% of the culmination of the mean annual increment measured in cubic feet. Exceptions may be made where resource management objectives or special resource considerations require earlier harvest, such as:
- stands in imminent danger from insect or disease attack;
  - wildlife habitat improvement;
  - scenery resource enhancement or rehabilitation;
  - ecosystem restoration; and
  - areas managed for Christmas tree production.

**Table 2.9.5: Guidelines for Allowable Stand Improvements and Regeneration Methods by Forest Vegetation Type**

Forest Vegetation Type	Stand Improvements	Regeneration Methods
Ponderosa pine	Pre-commercial thin Commercial thin Sanitation Release and weed Improvement cuts	Natural Artificial
Warm-Dry mixed conifer	Pre-commercial thin Commercial thin Sanitation Release and weed Improvement cuts	Natural Artificial
Cool-Moist mixed conifer	Pre-commercial thin Commercial thin Sanitation Release and weed Improvement cuts	Natural Artificial
Aspen with conifer	Commercial thin Sanitation Release and weed Improvement cuts	Natural Artificial
Aspen	Sanitation Improvement cuts	Natural
Engelmann spruce – subalpine fir	Commercial thin Sanitation Release and weed Improvement cuts	Natural Artificial

2.9.19 USFS Utilization Standards for live and dead trees are shown in Table 2.9.6 and should be followed.

**Table 2.9.6: U.S. Forest Service Utilization Standards<sup>1</sup>**

Type of Product	Minimum Diameter at Breast Height	Top Diameter	Minimum Length (feet)	Merchantability Factor
Live Trees				

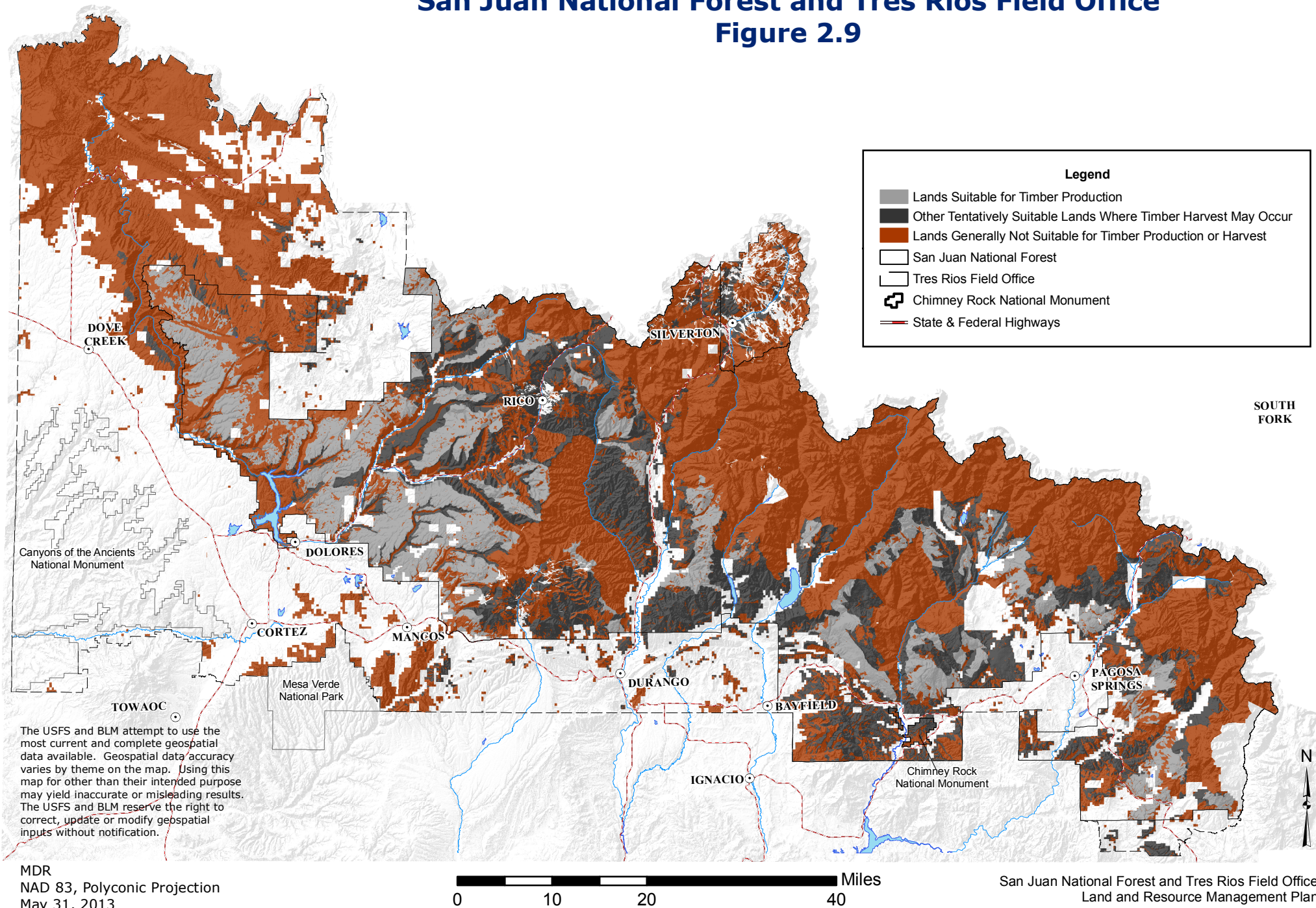
Type of Product	Minimum Diameter at Breast Height	Top Diameter	Minimum Length (feet)	Merchantability Factor
Coniferous sawtimber	7–9	6	8	10.67
Products other than sawtimber	5	4	6.5	Variable
<b>Dead Trees</b>				
Sawtimber	8–12	6–10	8-16	10.67
Products other than sawtimber	5	4	6.5	Variable
<sup>1</sup> FSH 2409.12 - Timber Cruising Handbook				



# Timber Suitability

## San Juan National Forest and Tres Rios Field Office

### Figure 2.9



## Additional Guidance

- 36 CFR 221, Timber Management Planning
- 36 CFR 223, Sale and Disposal of National Forest System Timber
- FSM 1920, Land Management Planning
- FSM 2400, Timber Management
- FSM 3400, Forest Pest Management
- FSH 1900 Planning
- Timber sale contract provisions and procurement contracts

## 2.10 Insects and Disease

### Introduction

Natural disturbances on SJNF and TRFO lands (including fire, insects, diseases, and weather events) play a fundamental role in shaping ecosystems at the stand scale and in creating the heterogeneous pattern of vegetation communities at the landscape scale. Fire is generally viewed as having the greatest potential to impact SJNF and TRFO lands, but, in actuality, many more trees are killed—and a larger area is influenced—by insects and disease, as recently evidenced by the pinyon Ips beetle (*Ips confusus*) epidemic of 2001–2004, which killed up to 90% of pinyon pine trees in the pinyon-juniper woodlands of southwest Colorado (Colorado Department of Natural Resources 2005), the ongoing spruce beetle (*Dendroctonus rufipennis*) epidemic that has killed many to most mature Engelmann spruce across an estimated 130,000 acres of the SJNF from 1996 to 2012 (Rocky Mountain Region 2012), or the other observed multi-year spikes in mortality in Douglas-fir, white fir, or aspen from bark beetles, or beetles combined with disease, since 2004.

Insects and diseases (which tend to be species-specific and often attack plants that have been weakened by other disturbances such as drought) affect tree growth, fire potential, nutrient cycling, and the composition and structure of the vegetation (Schmid and Mata 1996). At endemic levels, native insects have little impact on forest structure. At epidemic levels, insects can cause tree mortality across whole landscapes. Diseases generally increase gradually or remain at similar levels over time (Rocky Mountain Region 2010). Diseases often weaken trees, making them more susceptible to bark beetle attack. Defoliators, such as western spruce budworm (*Choristoneura occidentalis*), can cause substantial damage outside periods of drought when and where favorable moisture and stand conditions result in abundant host habitat.

Insects that can have a significant impact on forest stands on SJNF lands include spruce beetle, Douglas-fir beetle (*Dendroctonus pseudotsugae*), western pine beetle (*D. brevicornis*), mountain pine beetle (*D. ponderosae*), fir engraver beetle (*Scolytus ventralis*), and western spruce budworm (*Choristoneura occidentalis*). Other insects that impact the planning area include Douglas-fir pole beetle (*Pseudohylesinus nebulosus*), western balsam bark beetle (*Dryocoetes confusus*), engraver beetle (*Ips* sp.), roundheaded pine beetle (*D. adjunctus*), pinyon twig beetle (*Pityophthorus* sp.), aspen bark beetles (*Tryphloeus populi* and *Procryphalus mucronatus*), bronze poplar borer (*Agrilus liragus*), poplar borer (*Saperda calcarata*), western tent caterpillar (*Malacosoma californicum*), large aspen tortrix (*Choristoneura conflictana*), and aspen leaf miner (*Phyllocnistis populiella*). Grasshoppers (various species) and Mormon crickets (*Anabrus simplex*) can also become pests through periodic population increases.

Diseases that have a significant impact on forest stands on SJNF and TRFO lands include shoestring root rot (*Armillaria ostoyae*), Indian paint fungus (*Echinodontium tinctorium*), red ring decay (*Phellinus pini*), white trunk rot (*P. tremulae*), fir broom rust (*Melampsorella caryophyllacearum*), annosus root rot (*Heterobasidium annosum*), Douglas-fir dwarf mistletoe (*Arceuthobium douglasii*), Southwestern dwarf mistletoe (*A. vaginatum* ssp. *cryptopodum*), pinyon pine dwarf mistletoe (*A. divaricatum*), sooty bark canker (*Encoelia pruinosa*), hypoxylon canker (*Hypoxylon mammatum*), black canker (*Ceratocystis fimbriata*), cytospora canker (*Valsa sordida*), and black stain root fungus (*Leptographium wageneri*).

## Desired Conditions

- 2.10.1 Terrestrial ecosystems have age- or size-class diversity and compositional diversity that make them resistant to insect and disease outbreaks.
- 2.10.2 Insect and disease processes and cycles are similar to those that occurred during the reference period (HRV conditions) in MA 1.
- 2.10.3 Epidemic outbreaks are rare after management actions have been completed.
- 2.10.4 Mortality of aspen trees in high value aspen forests due to sudden aspen decline is significantly reduced.

## Objectives

- 2.10.5 Within 5 years, use coppice timber treatments or prescribed fire to regenerate 500 to 1,000 acres of low-elevation aspen forests that are experiencing sudden aspen decline on SJNF lands.
- 2.10.6 Within the next 10 years, reduce the risk of mortality due to bark beetles by increasing the mature-open development stage of ponderosa pine forests by 20,000 to 40,000 acres by using timber harvest and prescribed fire in the mature-closed development stage of ponderosa pine forests on SJNF lands.
- 2.10.7 Within 10 years, continue with treatment of developed recreation facilities, ski areas, and administrative sites to reduce susceptibility and hazards from insect and disease incidence, and increase long-term forest health, vigor, and resiliency on SJNF and TRFO lands.

## Additional Guidance

- FSH 2509.13, Burned Area Emergency Rehabilitation
- FSH 2509.25, Watershed Conservation Practices Handbook (Region 2 Supplement)

## 2.11 Fire and Fuels Management

### Introduction

The 1995 Federal Wildland Fire Management Policy (USDA and USDI 1995, updated 2001) contains policies that set the overall direction for federal fire agencies with regards to fire management. The policy requires fire management plans (FMPs) that are integrated with the resource management plans for the USFS and BLM.

The National Fire Plan, a joint planning effort by the USDA and the USDI aimed at reducing immediate hazards to communities in the WUI and ensuring agency preparedness for extreme fire conditions, was completed in 2001 (USDI and USFS 2001). In 2004, the San Juan Public Lands Center developed a strategy to accelerate its efforts to implement watershed and vegetation restoration components of the National Fire Plan in its Accelerated Watershed/Vegetation Restoration Plan.

The San Juan National Forest/Tres Rios Field Office Fire Management Plan (FMP) is a strategic plan defining the fire management program based on the SJNF's and TRFO's desired conditions and objectives. The FMP addresses strategies for all aspects of fire management activities, including implementation tiered from the National Fire Plan (USDA and USDI 2001a) and Accelerated Watershed/Vegetation Restoration Plan. The response to wildland fire, regardless of ignition source or location, is set forth in the FMP and addresses a full range of fire management activities that support ecosystem sustainability, values to be protected, firefighter and public safety, and environmental issues.

The LRMP defines the role of wildland fire and fire management activities covered by the FMP. This LRMP will result in an update or revision of the FMP. Within the FMP are goals, strategies, and guidelines relating to fire based on the overall direction of, and compatibility with, the LRMP. The FMP relies on a cooperative and collaborative process with other federal, state, and local agencies, fire managers, and other stakeholders to develop and implement consistent fire planning. Such planning will include defining Fire Management Units and providing the appropriate management response for all wildland fire starts that are consistent with desired conditions and resource objectives on the SJNF and TRFO.

Ecological and social trends posing management challenges include the following:

- Many of the ponderosa pine and warm-dry mixed conifer vegetation types are out of their HRV for fire frequency since they have missed many cycles of fire, which makes them very susceptible to large scale destructive wildfires.
- The SJNF and TRFO, like the rest of the West, is facing an expansion of rural development in or near forested areas, making fire and fuels management a critical program for federal agencies to manage.
- Requirements and/or constraints associated with prescribed fire are common, collectively making proactive use of fire for ecological benefit more challenging.

The use of wildland fire, along with mechanical and other fuels management strategies, should create forest conditions that meet desired conditions for the vegetation types within the planning area. Providing appropriate response to all wildfires and allowing fire to perform its natural role in the ecosystem, as much as possible, will be an integral part of the program emphasis. Recognizing that effective fire management spans jurisdictional boundaries, the fire and fuels program will also continue to partner with, and assist, local jurisdictions and communities in order to develop community wildfire protection plans designed to reduce the risk of wildfires.

## **Desired Conditions**

- 2.11.1 Firefighter and public safety concerns are met for all fire management and fuel treatment projects.
- 2.11.2 Wildfire behavior in the WUI (in and around developed areas and communities) does not result in damage to property and protects public safety.
- 2.11.3 Wildland fire management maintains a balance between fire suppression and use of wildland fire (including both prescribed fire and natural ignitions) to regulate fuels and maintain forest ecosystems in desired conditions.
- 2.11.4 Use of wildland fire and fuels reduction treatments creates vegetation conditions that reduce the threat to real property and infrastructure from wildfire.
- 2.11.5 The WUI will have defensible space and dispersed patterns of fuel conditions that favorably modify wildfire behavior and reduce the rate of wildfire spread in and around communities at risk.
- 2.11.6 Major vegetation types reflect little or no departure from historic range of variation of fire frequency and intensity (e.g., reflect Fire Regime Condition Class 1).
- 2.11.7 Planned and unplanned fire ignitions are used to increase resiliency and diversity across all forest and rangeland vegetation types.
- 2.11.8 Fire is reintroduced to increase the resistance and resiliency of the warm-dry mixed conifer and ponderosa pine forest types in landscape such as the Hermosa and Piedra areas.
- 2.11.9 The occurrence of low elevation fires burning upward into spruce-fir forest will increase over time to promote the heterogeneity of spruce-fir forests.

## Objectives

- 2.11.10 Annually, for the next 10 years, complete an average of 7,000 acres of SJNF hazardous fuels reduction in the WUI and an average of 1,000 acres of TRFO hazardous fuels reduction in the WUI.
- 2.11.11 Annually, for the next 10 years, complete an average of 4,000 acres of fuels reduction and resource enhancement using fire managed for resource benefit on SJNF lands, and an average of 1,000 acres of fuels reduction and resource enhancement using fire managed for resource benefit on TRFO lands.
- 2.11.12 Include evaluations for immediate suppression, management for resource benefit, or a combination of both actions for wildland fire response on both SJNF and TRFO lands.

## Standards

- 2.11.13 Natural fire ignitions will be used, when feasible, to reintroduce fire into fire-adapted and dependent ecosystems. Fire for ecological benefit will be used as a resource management tool where and when allowed.
- 2.11.14 Restoration and recovery in areas, when possible, must be provided where critical resource concerns merit rehabilitation for controlling the spread of invasive species, protecting areas of cultural concern, or protecting critical or endangered species habitat.

## Guidelines

- 2.11.15 The response to wildland fire, including the role of natural fire, should be evaluated as described in Table 2.11.1 on SJNF lands. Unplanned ignitions, wildland fire tactical options, and planned ignitions on TRFO lands will be determined on a case-by-case basis. Implementation direction for areas with special designations (e.g., ACECs, RNAs) is found in Chapter 3 of this LRMP.

**Table 2.11.1: Fire Management Direction for San Juan National Forest Lands**

Management Area	Unplanned Ignitions	Wildland Fire Tactical Options	Planned Ignitions <sup>c</sup>
1	x <sup>a</sup>	x	x <sup>b</sup>
2	x <sup>b</sup>	x	x <sup>b</sup>
3–8	x	x	x

<sup>a</sup> Within designated wilderness areas and the Piedra Area, dozers are prohibited (except with Regional Forester approval). Use of helicopters, motorized equipment, and/or mechanical transport is prohibited (except with Forest Supervisor/ District approval). Within other MA 1 areas, dozers are prohibited except with Forest Supervisor/Field Office Manager approval. Chainsaws, engines, ATVs, and pumps are allowed without Forest Supervisor approval.

<sup>b</sup> Mechanical equipment and prescribed fires in RNAs and cultural significant areas would have to be compatible with the overall purposes and objectives for those areas.

<sup>c</sup> Planned ignitions may be implemented by management action authorized by approved plans.

- 2.11.16 Seeding and other site rehabilitation practices should be provided, as necessary, on wildland fire and managed wildland fire areas. Fire suppression support activities and facilities (including constructed fire lines, fuel breaks and safety areas, fire camps, staging areas, heli-bases, and heli-spots), as well as mechanical and prescribed fire treatment areas, should follow the same site rehabilitation practices.
- 2.11.17 Aerial application of retardant in live water, wetlands, and riparian areas should be avoided unless necessitated by human safety or property loss considerations.



## Additional Guidance

- FSM 5100, Fire Management
- BLM Manual 9210, Fire Management
- FSM 5110, Wildfire Prevention
- FSM 5120, Presuppression Management
- FSM 5130, Fire Suppression
- FSM 5140, Prescribed Fire
- FSM 5150, Fuel Management
- FSM 5160, Fire Management Equipment and Supplies
- FSM 5170, Fire Management Cooperation
- BLM 9200 Series Handbooks for Fire Management Plans, Fire Effects, etc.
- FSM 5180, Fire Reports
- FSM 5190, Management
- FSH 5109.14, Individual Fire Report Handbook
- FSH 5109.17, Wildland Fire Qualifications Handbook
- FSH 5109.18, Wildland and Prescribed Fire Qualifications System Guide
- PMS 310-1, Wildfire Prevention Handbook
- FSH 5109.19, Fire Management Analysis and Planning Handbook
- FSH 5109.31, Wildfire Cause Determination Handbook (NWCG Handbook 1)
- FSH 5109.32a, Fireline Handbook (NWCG Handbook 3)
- FSH 5109.34, Interagency Fire Business Management Handbook (NWCG Handbook 2)
- Nationwide Aerial Application of Fire Retardant on National Forest System Land ROD (USFS 2011)
- Departmental Manual Part 620 for Wildland Fire Management
- Guidance for Implementation of Federal Wildland Fire Management Policy (USDA and USDI 2009)
- Interagency Prescribed Fire Planning and Implementation Procedures Reference Guide (USDA and USDI 2008)
- BLM Handbook H-1740-2 - Integrated Vegetation Management Handbook
- BLM Handbook H-1742-1 - Burned Area Emergency Stabilization and Rehabilitation Handbook
- President's Healthy Forests Initiative (2002)
- Healthy Forests Restoration Act (2003)
- National Cohesive Wildland Fire Management Strategy (Wildland Fire Leadership Council. 2011)
- 2001 Review and Update of the 1995 Federal Wildland Fire Management Policy (USDA and USDI 1995)
- A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment 10-Year Comprehensive Strategy (USDA and USDI 2001b)
- A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment 10-Year Comprehensive Strategy Implementation Plan (USDA and USDI 2002)
- Wildland Fire Use Implementation Procedures Reference Guide (USDA and USDI 2005)
- Interagency Standards for Fire and Fire Aviation Operations (Red Book), updated annually, 2005 (USFS et al. 2013)
- San Juan BLM Wildland-Urban Interface Hazardous Fuels Reduction Programmatic Environmental Assessment (BLM 2004)
- Fire and community wildfire protection plans for Montezuma, La Plata, Archuleta, Dolores, San Juan, Mineral, Conejos, Montrose, San Miguel, Hinsdale, and Rio Grande Counties

Other standards and guidelines that pertain to fire management are found in Sections 2.3 and 2.8.

## 2.12 Air Quality

### Introduction

Visitors to public land in southwest Colorado generally expect clear, clean air and the ability to view unobstructed vistas as part of their overall experience. Air quality is also an integral part of the natural environment and affects water quality, aquatic ecosystems, soil chemistry, snow chemistry, snowmelt processes, and vegetation.

The Weminuche Wilderness Class I Area has been designated by Congress as an “outstanding special area”—deserving the highest air quality protection in the nation. The goal is to protect natural air quality conditions (conditions substantially unaltered by humans or human activities) in the Weminuche Wilderness Class I Area. Natural conditions are measured directly through air quality monitoring and indirectly using air quality related values (AQRVs). AQRVs for the Weminuche Wilderness Class I Area are lake chemistry, soil chemistry, flora and fauna assemblages, atmospheric deposition and chemistry, snow chemistry, and visibility. Air quality monitoring commitments will continue long term, as stated in the Weminuche Wilderness Monitoring Plan (USFS 1991) and through agreements made with air quality regulatory agencies.

Several air pollutants have become major concerns on the SJNF and TRFO over the last 10 years. These include mercury, nitrogen, sulfur, methane, carbon dioxide, ozone, and ozone precursors. Many of these pollutants originate from outside the planning area. Oil and gas projects and prescribed burns and wildfire are activities that occur on the SJNF and TRFO with the potential to impact air quality. SJNF and TRFO managers will work with agencies, organizations, tribes, and other entities to actively pursue actions designed to reduce the impacts of pollutants from sources both within and outside the SJNF and TRFO. These measures will include active membership in local and regional air quality protection stakeholder groups, Prevention of Significant Deterioration (PSD) permit review, a continued commitment to air quality monitoring, and the implementation of air pollution mitigation where appropriate. Atmospheric deposition of nitrogen from anthropogenic sources is increasing and has the potential to affect water quality and aquatic and terrestrial ecosystems. Water bodies throughout the planning area are showing increasing levels of mercury pollution. Recently, McPhee and Vallecito Reservoirs were designated as impaired water bodies because of mercury contamination, and both reservoirs have consumption advisories for mercury contamination of fish (CDPHE 2012). The numerous regional coal-fired power plants are large sources of atmospheric mercury that can pollute water on the SJNF and TRFO (Wright 2011).

Fire has the potential to produce smoke that may affect the public and temporarily degrade visibility. Receptors that are sensitive to temporary air pollution (including nursing homes, hospitals, and schools) will continue to be an important consideration for smoke management. In addition, the impact of smoke on the highly valued scenic vistas within the planning area will continue to be a concern. Smoke will be managed in conjunction with the State of Colorado through burning permits and to address local concerns. Tradeoffs between short-term air quality impacts and long-term forest health are recognized and will continue to be a management challenge.

The Colorado BLM has developed a statewide Colorado Air Resource Protection Plan. The plan identifies the many components necessary for statewide air quality protection from BLM-authorized activities throughout Colorado. It includes the goals, objectives, and management actions for air quality protection. Examples of management actions include monitoring, regional air quality modeling and modeling studies, refined project analysis, emissions inventories, air pollution reduction measures, and adaptive management. It is anticipated that the Colorado Air Resource Protection Plan could provide more detailed incremental analysis that will better inform future project-level decisions (such as leasing) made as a result of this LRMP. It is also anticipated that the direction in the Colorado Air Resource Protection Plan will be modified based on implementation effectiveness. The SJNF and TRFO will utilize the direction identified in the Colorado Air Resource Protection Plan to mitigate air quality impacts and supplement the air quality management direction identified in the LRMP. The current direction identified in the Colorado Air Resource Protection Plan is part of the LRMP project record.

Additional air quality control technology and emission reductions could be necessary to achieve air quality desired conditions, as identified through future air quality modeling and monitoring. Such measures would be implemented through subsequent analysis and in consultation with affected agencies, including federal land management agencies, CDPHE and EPA.

## **Desired Conditions**

- 2.12.1 Air quality in the Weminuche Wilderness Class I Area maintains natural conditions. Indicators of natural conditions include AQRVs of visibility, water and snow chemistry, precipitation/atmospheric chemistry, soils chemistry, and aquatic/terrestrial biota.
- 2.12.2 Air quality for the Class II areas within the planning area are maintained or improved with respect to pollutant concentrations so that human health and the integrity of associated aquatic and terrestrial ecosystem components are protected.
- 2.12.3 Activities conducted on the SJNF and TRFO support natural air quality conditions at nearby Class I areas outside the planning area (such as Mesa Verde National Park). Determination of what constitutes “natural conditions” will be based on information provided by managers of potentially affected Class I areas.
- 2.12.4 Visibility at designated scenic vistas in Class II areas is maintained or improved within the planning area (see desired conditions in Section 2.15).
- 2.12.5 Visibility in the Weminuche Wilderness continues to improve so that natural conditions are achieved. Activities conducted on the SJNF and TRFO do not hinder progress towards achieving natural visibility conditions in Class I areas managed by other agencies, such as Mesa Verde National Park.
- 2.12.6 Management activities on the SJNF and TRFO control dust in order to minimize impacts of dust-on-snow events.
- 2.12.7 Administrative and permitted activities on SJNF and TRFO lands emit the lowest practicable greenhouse gas emissions and have the smallest ecological footprint possible to promote sustainable natural resource management.

## **Objectives**

- 2.12.8 For the Weminuche Wilderness Class 1 Area, improve air quality so that flora and fauna AQRVs that are at risk (including lichens, amphibians, and aquatic organisms) recover to a level that is within the limits of acceptable change (compared to natural conditions) by the next planning period so that there is no humanly perceptible change in visibility (visual range, contrast, coloration) from that which would have existed under natural conditions (conditions substantially unaltered by humans or human activities).
- 2.12.9 Over the implementation life of the LRMP on both TRFO and SJNF lands, prevent or reduce the atmospheric deposition of nitrogen and sulfur and allow no more than a 10% change from established baseline for lakes with an acid neutralizing capacity (ANC)  $\geq 25 \mu_{eq}/L$ , and for lakes with an ANC  $< 25 \mu_{eq}/L$  allow no more than  $1 \mu_{eq}/L$  decrease in ANC within agency control.
- 2.12.10 Over the implementation life of the LRMP, prevent or reduce airborne nutrient and mercury deposition impacts to sensitive high-elevation lakes in the Weminuche Wilderness Class I Area; allow no detectable mercury, no more than  $2 \mu_{eq}/L$  of ammonium, and no late summer nitrate.



## Standards

- 2.12.11 All new facilities and installations must use engines that meet the following standards within a stationary facility for fluid minerals (does not apply to non-stationary drill rigs or other temporary/mobile engines). Engines less than 300 horsepower de-rated for elevation (excluding very small engines less than 40 horsepower) must not exceed a nitrogen oxide (NO<sub>x</sub>) limit of 2.0 grams per horsepower-hour or the minimum acceptable limit as determined by air quality regulatory agencies, using whichever is the most restrictive emission limit.
- 2.12.12 All replacement or reconditioned reciprocating internal combustion engines less than 300 horsepower de-rated for elevation (excluding very small engines less than 40 horsepower) must not exceed a NO<sub>x</sub> limit of 2.0 grams per horsepower-hour or the minimum acceptable limit as determined by air quality regulatory agencies, using whichever is the lower emission limit.
- 2.12.13 All new facilities and installations will use engines that meet the following standards within a stationary facility for fluid minerals (does not apply to non-stationary drill rigs or other temporary/mobile engines). Engines 300 horsepower or greater de-rated for elevation must not exceed a NO<sub>x</sub> limit of 1.0 gram per horsepower-hour or the minimum acceptable limit as determined by air quality regulatory agencies, using whichever is the lower emission limit.
- 2.12.14 All replacement or reconditioned reciprocating internal combustion engines 300 horsepower or greater de-rated for elevation must not exceed a NO<sub>x</sub> limit of 1.0 gram per horsepower-hour or the minimum acceptable limit as determined by air quality regulatory agencies, using whichever is the lower emission limit.
- 2.12.15 Green completion technology for oil and natural gas well completions and for restimulation or refracture activities during workovers is required to prevent venting and most flaring of methane gas and other air pollutants into the atmosphere. Green completion practices include, but are not limited to, 1) maximal capturing of fluids, well effluent, and flammable gases as soon as practicable during flowback and cleanout operations; 2) separation of sand, hydrocarbon and other liquids, and gas from saleable products of saleable quantity; 3) storage and delivery of saleable products to sales line; and 4) environmentally safe disposal of non-saleable waste products. Venting of flammable gas during the well completion process must not be allowed except for gas testing or for safety and emergency situations. This standard is required for all non-wildcat oil and natural gas wells and will be implemented in all places where technically feasible. (Technically feasible will be determined by the BLM and USFS, with input from air quality regulatory agencies as needed).
- 2.12.16 For exploration, production, transport, and processing of oil and natural gas, storage vessels must not leak and tank thief hatches must be closed when not being serviced during liquid transport, repair, or measuring activities. Valves must be maintained in a leak-free condition (<10,000 parts per million [ppm] leakage). The venting of volatile organic compounds and hazardous air pollutants emissions will achieve at least 95% emission reduction from uncontrolled emissions through the use of vapor recovery units, combustion, or other practices allowed by air quality regulatory agencies.
- 2.12.17 Valves and pipes in liquid hydrocarbon service must periodically (at minimum on an annual basis) be inspected visually, audibly, or by other means for evidence of leaks. If leaks are detected, equipment must either be repaired or replaced as applicable.
- 2.12.18 No-bleed, low-bleed, or air-driven pneumatic devices are required for all new and retrofitted oil and natural gas production sites to reduce methane emissions. Exceptions may be made for safety and operational requirements.
- 2.12.19 All new separators and dehydrators used for natural gas production must use 95% control efficiency or better volatile organic compound emission control technology compared to uncontrolled emissions.

- 2.12.20 At any one point in time, no more than four fluid mineral well pads and associated access roads will be constructed and drilled (or re-completed) with combustion engines concurrently in any given square mile. This standard does not limit the number of well pads per square mile, only the simultaneous construction and drilling of wells. This standard is necessary to minimize near-field air pollutant concentrations and ensure compliance with National Ambient Air Quality Standards (EPA 2013).

## **Guidelines**

- 2.12.21 Construction activities that disturb a surface area greater than 1 acre and are of a duration greater than 5 days should use effective dust-suppression materials and techniques to prevent dust from visibly transporting from the area of disturbance (e.g., well pad, landing, parking area, mine) or drift more than 50 feet from the road prism. In addition, all activities should handle, transport, and store material in such a way to prevent particulate matter (dust) from visibly transporting from the storage area or area of disturbance. There will be no oil, solvents, or other unacceptable contaminants in fluids used for dust abatement.
- 2.12.22 Volatile organic compounds, hazardous air pollutants, and greenhouse gases should not be vented from existing wells and should achieve at least 95% emission reduction from uncontrolled emissions through capture and delivery to sales pipeline, vapor recovery units, combustion, or other practices allowed by air quality regulatory agencies. This would eliminate most venting from well blow-downs, during the well completion process, from oil wells freely venting casing gas, and from defective gas well-bores. Exceptions may be allowed for Bradenhead testing or other well tests where venting occurs for time periods of less than 10 minutes.
- 2.12.23 For new lease or new development areas, new mineral development facilities should be collocated and/or centralized. Facilities include roads, well pads, utilities, pipelines, compressors, power sources, fluid storage tanks, and other associated equipment. Collocation of wells (more than one well per pad) should be required where feasible.
- 2.12.24 Optimization (use of fewer, larger, and more efficient engines with lower emission rates, rather than using many small engines with higher cumulative emissions, less efficiency, and higher cumulative horsepower) should be required for fluid mineral development. For example, if new activities add an additional small engine(s) so that multiple combustion engines less than 40 horsepower each exist on the same location, the SJNF or TRFO will review the site to determine if optimization should be used to reduce total location emissions.
- 2.12.25 Centralized and efficient liquid gathering systems should be used to carry condensate and produced water from wells to centralized gathering facilities to reduce mobile source emissions and other traffic impacts.
- 2.12.26 Drill rig engines used for new or recompleted wells on the SJNF and TRFO should meet the most current non-road diesel engine rules for Tier 2, Tier 4 transitional, or Tier 4 emission standards as these standards phase in over time.

## **Additional Guidance**

- BLM 7300, Air Resource Management, Climate and Air Quality
- FSM 2580, Air Resource Management
- FSM 5100, Fire Management
- U.S. Environmental Protection Agency (EPA) Interim Air Quality Policy on Wildlands and Prescribed Fires (1998)
- Weminuche Wilderness Monitoring Plan for Air Quality Related Values (USFS 1991)
- Federal Land Managers AQRV Workgroup Phase I Report (FLAG 2010)

## 2.13 Access and Travel Management

### Introduction

The transportation system within the planning area consists of roads and trails that provide people with access to public lands and to private in-holdings. Virtually every activity that takes place within the planning area uses the transportation system (including outdoor recreation, wildfire management, livestock and wildlife management, natural resource development, private in-holdings access, and electronic communication site and utility corridor maintenance, as well as the management and monitoring of public lands).

There are over 3,000 miles of NFS and BLM roads and primitive roads, and more than 1,300 miles of NFS and BLM trails in the planning area that are actively managed as components of the agencies' transportation systems. Many of these roads and trails were originally constructed in order to support management activities (including for fire suppression, timber harvesting, mining, livestock grazing, and recreation). Currently, the NFS road system where motorized use is authorized for public or administrative purposes is inventoried and mapped, but inventory and mapping of unmanaged routes is incomplete. Currently, most of the roads, primitive roads and trails located on BLM lands within the TRFO have not yet been fully inventoried or mapped.

The majority of system roads are open to public use. Public use of individual roads may be allowed seasonally, or it may be permitted all year if there is a demonstrated need to provide year-round access. Some roads are reserved for administrative use by the USFS or BLM for management purposes or by permittees to access special use permit areas.

Trails generally fall into one of two general classes: non-motorized or motorized. Non-motorized trails may be further classified as non-mechanized (foot traffic, pack and saddle, etc.) and mechanized (mountain bikes). Motorized trails are generally intended for vehicles that are less than a certain specified width (usually 50 inches), which excludes most highway-legal vehicles, except motorcycles. In some cases, motorized trails may be designated for vehicles greater than 50 inches in width when there is a demonstrated need, such as providing challenging recreational opportunities for off-highway vehicles (OHVs).

In the last few decades, funding has not been sufficient to maintain all public land roads and trails to the standards associated with the maintenance classification assigned to each. Generally, the limited funding received has been focused on maintenance of higher standard roads that serve multiple-access needs and have the highest traffic volumes. Limited funding for trails has resulted in fewer miles of trails being maintained. It has also resulted in a focus on roads and trails that are deemed unsafe, those that receive the highest use, or those that present the greatest threat to ecological integrity.

Road management activities have included the decommissioning of roads, the construction of new roads, and the closure of roads. Decommissioning roads that are not needed for access (currently or in the foreseeable future) is generally performed when there is a need to reduce resource impacts through reducing runoff, re-establishing vegetation, and preventing future motorized use. Generally, new construction may occur when access to a particular resource or private in-holding is needed. These roads may be permanent, if intended for long-term use, or they may be temporary (such as many timber sale and exploratory roads). Closing roads or limiting motorized use to administrative purposes are management strategies that may be employed for a variety of reasons (including wildlife protection, resource protection, and/or public safety), and these closures may be long-term (multiple year) or seasonal. Population growth and the increased development of private in-holdings have increased the demand for use of roads within the planning area as primary access routes to residential developments. This has created a demand to establish, monitor, and administer special use authorizations and commercial road use permits. Many of these roads require upgrades in order to accommodate all-weather, year-round traffic. This demand for private land access across public lands, or by using NFS or BLM roads, has resulted in a need for the agencies to evaluate the jurisdictional status of roads that are used predominantly for residential access.

The demand for recreational motorized and non-motorized access has increased dramatically in recent years. Advances in the performance and the technology of OHVs/ATVs, utility vehicles, motorcycles, snowmobiles, mountain bikes, and wheelchairs have increased the demand for additional motorized and non-motorized recreational access and routes. New technology and increased motorized use within the planning area has resulted in some users creating new routes (also known as user-created routes or social routes). Resource problems related to these user-created routes are developing across the planning area, especially in areas that have been historically open to cross-country motorized travel.

## **Motorized Travel Suitability and OHV Area Designations**

A key component of access and travel management is the identification of areas where motorized travel is prohibited, where it is allowed, and any use limitations in areas where it is allowed. While the BLM and USFS use very similar criteria in determining suitable locations for motorized travel, the agencies do have different processes for identifying areas where motorized travel is allowed and prohibited.

The USFS and the BLM have agency-specific direction for the management of motorized travel and OHV use. The USFS Travel Management Rule (36 CFR 212, Subparts A, B, and C) requires that each national forest designate a system of roads, trails, and areas for motor vehicle use by vehicle class and, if appropriate, by time of year. The rule addresses any future proliferation of user-created routes by prohibiting cross-country motorized travel (except in small designated areas). The BLM has similar requirements for motorized off-road use set forth in 43 CFR 8340 and 8342. While travel management plans developed under the USFS and BLM direction cited above will result in site-specific, route by route designations, this LRMP does not. Rather, the area classifications made in this LRMP provide a framework for future route-by-route designation. Some of the criteria used for the eventual designation of specific routes would include the need for access, impacts to private property, desired recreation opportunities, erosion potential and slope, resource protection, route density, and wildlife habitat considerations.

A travel management plan is not intended to provide evidence bearing on or addressing the validity of any assertion associated with Revised Statute 2477 (R.S. 2477). R.S. 2477 refers to a law passed by Congress in 1866 that provided that “the right-of-way for the construction of highways over public lands, not reserved for public uses, is hereby granted” (43 USC 932). Although the 1866 act was repealed by the FLPMA in 1976, rights associated with R.S. 2477 were preserved. R.S. 2477 rights are determined through a process that is entirely independent of the BLM’s or USFS’s LRMP planning process. Consequently, travel management planning should not take into consideration R.S. 2477 assertions or evidence. Travel management planning should be founded on an independently determined purpose and need that is based on resource uses and associated access to public lands and waters. At such time as a decision is made on R.S. 2477 assertions, the USFS or BLM will adjust its travel routes accordingly.

Travel management decisions for motorized route designations on NFS lands are illustrated on a Motor Vehicle Use Map, which is updated annually to reflect any new travel management updates. BLM route designations are illustrated on a travel map that is published in conjunction with any new travel management decision. Motorized travel off the designated roads, motorized trails or areas, or otherwise inconsistent with the designations displayed on a Motor Vehicle Use Map or BLM travel map is prohibited, unless the motorized use has been specifically exempted under USFS or BLM direction or by written authorization.

## **BLM Motorized Use Classifications**

In accordance with definitions and criteria in 43 CFR 8340, the BLM designates OHV management areas by classifying areas as closed, limited, or open to motorized travel. Motorized travel within closed areas is prohibited; within open areas, motorized travel is allowed cross-country, and is not limited to specific roads and trails. Within areas classified as limited, motorized travel is limited to *designated* roads, primitive roads, and trails where site-specific travel management planning has occurred or, where site-specific travel management planning has not occurred, interim management limits motorized use to *existing* roads and trails.

The majority of TRFO land is currently unclassified and has not undergone site-specific travel management planning with a few exceptions. The 1985 San Juan/San Miguel RMP limited motorized travel to existing roads in the Silverton SRMA (51,180 acres), Bull Canyon (5 acres), Indian Henry's Cabin (160 acres), and Disappointment Valley (46,000 acres). The RMP also closed the Dolores SRMA (22,464 acres), Weber Mountain (4,680 acres), Menefee Mountain (4,040 acres), Perins Peak/Animas Mountain (3,200 acres), and the Dolores WSA (28,539 acres). Additionally, the Mancos-Cortez Travel Management Plan (USFS and BLM 2008) analyzed limiting motorized use to a designated system of roads and trails in the Phil's World and Mud Springs area (see Figures 2.13.3 and 2.13.4). This system of routes is carried forward under this LRMP and would further limit mechanized travel to designated routes upon completion and publication of supplemental rules in the Federal Register (see Volume III, Appendix E, Cortez SRMA, for additional guidance).

For the remainder of the TRFO (and outside of 'open' or 'closed' areas), a travel management planning process will transition management from a "limited to existing roads and trails" system to a "limited to designated roads and trails" system within 5 years of the approval of this LRMP. This process will include public involvement and will be guided by the designation criteria found in 43 CFR 8342.1. Additional limitations to travel that could be proposed may include time of day restrictions, method of travel restrictions, vehicle size restrictions, seasonal restrictions, administrative use restrictions, or other types of limitations. A number of future data needs have been identified, which include, but are not limited to:

- establishment of rights-of-way (ROWs) and easements for transportation linear features;
- inventory of existing routes and constructed feature characteristics;
- needed route improvements to facilitate access to and across public lands;
- methods and volume of use on existing routes;
- modes of travel appropriate to specific routes; and,
- resource issues.

In accordance with 43 CFR 8341.2, where OHVs are causing or will cause considerable adverse effects on soils, vegetation, wildlife, wildlife habitat, cultural resources, historical resources, threatened or endangered species, wilderness suitability, other authorized uses, or other resources, the affected areas will be immediately closed to the type(s) of vehicle causing the adverse effects until they are eliminated and measures are implemented to prevent recurrence.

Under the interim system of limiting motorized use to existing roads and trails as proposed in this LRMP, motorized use is limited to those roads and trails depicted on Figure 2.13.1, which represents the current known network of transportation linear features within the TRFO. If necessary, during the course of comprehensive travel planning, the existing route map may be updated and posted on the TRFO website (BLM 2013). Printed copies of updated existing route data will be made available at the Dolores Public Lands Office upon request. During interim management of limited areas, and in areas identified as limited to designated, the following four exceptions allow motorized vehicle travel away from existing roads, primitive roads, and trails under the circumstances specified in each. In closed areas, motorized use would be allowed under exceptions 1 and 2 only.

Exceptions:

1. Any vehicle whose use is expressly authorized in writing by the Authorized Officer (administrative access, permitted access);
2. Any fire, military, or law enforcement vehicle while it is being used for emergency purposes;
3. For purposes such as parking, turning around, or passing another vehicle;
4. Oversnow use by vehicles designed for that purpose when snow cover is adequate to protect the underlying vegetation and soils from the impacts of that use, except in:
  - a. Designated (by CPW) big game severe winter relief and winter concentration areas, and
  - b. Designated (by CPW) occupied Gunnison sage-grouse habitat.

In areas where route designations are completed, such as areas covered by the 1985 San Juan/San Miguel RMP and the Mancos-Cortez Travel Management Plan and following completion of route designations throughout the remainder of TRFO lands, any routes subsequently approved by the BLM will be incorporated into the designated route system.

### ***USFS Motorized Use Classifications***

For NFS lands, overground motorized suitability is divided into three classes: 1) unsuitable, 2) suitable, and 3) suitable opportunity areas. Unsuitable areas include wilderness areas and other areas that are generally not conducive to road or motorized trail system development for resource, habitat, and/or constructability reasons. Suitable areas are those that have an existing developed road and/or motorized trail system that, for the most part, serves the recreation and resource access needs of the particular area. Suitable areas would not generally be considered for net overall expansion of the transportation system. Suitable opportunity areas are those that have an existing road and/or motorized trail system, and where there is potential to improve the system by adding to the existing system of routes. Changes to the existing system (such as to address resource concerns or enhance recreation experiences) are allowed within unsuitable, suitable, and suitable opportunity areas, including the elimination or decommissioning of roads and trails. Areas with specific management (as identified in Section 3.0 of the LRMP) may have additional travel management restrictions.

A number of travel landscapes on the SJNF have not undergone site-specific overground travel management planning prior to publication of this LRMP. For these landscapes, travel suitability as depicted on Figure 2.13.1 primarily reflects current management and is subject to change through a plan amendment based on site-specific analysis that will be completed through the travel management planning process. Travel management planning will be initiated in these areas after this LRMP is finalized, and in some cases is already underway.

Oversnow motorized suitability on NFS lands is divided into two classes: 1) unsuitable and 2) suitable (see Figure 2.13.2). Suitable areas allow for oversnow travel by snowmobiles, while motorized travel is prohibited in unsuitable areas. Providing a quality outdoor recreation experience for both motorized and non-motorized recreation was a primary goal in determining suitable and unsuitable areas for motorized travel. Additionally, areas that have snow cover most years (i.e., snow availability) and areas that are accessible in the winter were considered, as well as resource considerations (such as, but not limited to, critical and severe winter wildlife habitat). Subsequent oversnow travel planning following approval of this LRMP will be necessary to implement oversnow suitable and unsuitable area boundaries as delineated in the LRMP.

### **Program Emphasis**

Access and opportunity to experience areas through both motorized and non-motorized travel is a key component of recreation, as well as a primary management emphasis for the SJNF and TRFO. Efforts will focus on the designation of effective motorized and non-motorized travel routes over the long-term, consistent with desired conditions. Signing, enforcement, public information, and route maintenance and restoration will take place, as appropriate.

The transportation system program will emphasize a minimum transportation system that provides safe and efficient public and agency access to the public lands. Agency-specific travel management planning processes will be used to identify management opportunities for ensuring that the systems are efficiently maintained, environmentally compatible, and responsive to agency and public needs. Agency managers will work towards aligning the total miles of roads and trails within SJNF and TRFO lands with fiscal constraints. Opportunities will be sought to shift road management to the appropriate public road authority when it is determined that a specific road is primarily used for purposes other than SJNF (FRTA) access, is used for mail delivery, school bus routes, or some other local governmental purpose, or is used for year-round residential access to private property within or adjacent to SJNF.

Reconstruction and maintenance activities will focus on diminishing impacts to resources, particularly water resources and aquatic ecosystems, and improving roadway safety while reducing the backlog of deferred maintenance.

Road construction and reconstruction requirements needed to support resource development activities will be determined and evaluated at the project level. These roads will be designed and constructed to minimize surface disturbance by collocating new facilities, when feasible, and using the existing road

networks to the maximum extent possible. Roads will be constructed or reconstructed to a standard commensurate with the planned use. Design and construction BMPs will be used to minimize impacts to wildlife, water resources, aquatic ecosystems, and other resource concerns identified at the project level. Unless designated as part of the SJNF or TRFO transportation system, roads constructed for resource development will

- be temporary;
- be maintained to standard by the permittee or responsible party through written authorization;
- be decommissioned and revegetated with SJNF - or TRFO-approved native species; and
- be monitored for success for 3 years following project completion.

Travel management planning during LRMP implementation will result in the designation of a system of roads, trails, and areas for motorized use by vehicle class and season of use. The principal goal of travel management planning is to reduce the development of unmanaged roads and trails and the associated impacts to water resources and aquatic ecosystems, wildlife conflict impacts, and user conflicts. The travel management planning process aims to provide a variety of road and trail access for recreation, special uses, other forest resource management, and fire protection activities. Planning, design, and operation will seek to maximize user experience while addressing safety and resource protection needs.

## **Desired Conditions**

- 2.13.1 The transportation system within the SJNF and TRFO planning area consists of roads, high-clearance or primitive roads, trails, and bridges that are fiscally sustainable and safe as appropriate for the designated use or desired user experience; they allow for the use of, and enjoyment by, the public, and they meet resource management objectives. Sufficient condition surveys and inspections are conducted to promote road safety and prioritize road maintenance expenditures.
- 2.13.2 The SJNF and TRFO transportation system provides reasonable and legal access for resource management and recreation; it is dynamic and adaptable to resource and user needs.
- 2.13.3 SJNF and TRFO destination and loop trails exist for motorized and non-motorized recreation users. New trail development within the planning area focuses on the creation of loop opportunities and when feasible, using existing routes to do so, when such use does not compromise the intent and sustainability of the route. New routes within the planning area are designed with the goals of preserving settings, complementing the landscape, and providing the desired user outcomes/benefits.
- 2.13.4 Public access to SJNF or TRFO lands that cross private lands and/or cross other jurisdictions is acquired, retained or improved through proper authorization and coordination with adjacent landowners.
- 2.13.5 The road and trail systems on the SJNF and TRFO have adequate destination signage, mapping, and route markers to assist transportation system users in navigating throughout the planning area.
- 2.13.6 The public has access to information about the SJNF and TRFO transportation system (including specific travel route designations, available recreational opportunities, environmental stewardship guidelines, and safe travel information).
- 2.13.7 Motorized use on SJNF and TRFO lands occurs only on designated roads and trails, as well as in small designated open areas (except as exempted by 36 CFR 212.51 and 43 CFR 8340). No new unauthorized or user-created routes develop within SJNF or TRFO lands. Any addition of new designated routes to the transportation system will be analyzed using the appropriate planning process and level of environmental analysis.

- 2.13.8 Roads and trails within the SJNF and TRFO that are identified for closure are decommissioned and re-established with native vegetation cover.
- 2.13.9 Roads on SJNF lands are managed by the appropriate public road authority when any one of the following conditions exists:
- the road serves predominantly non-SJNF traffic;
  - the road is necessary for mail, school, and/or other local governmental purposes; or
  - the road provides year-long residential access to private property within, or adjacent to, the planning area.
- 2.13.10 Travel management plans are complete for all SJNF and TRFO lands within 5 years of adopting this LRMP. Travel management planning remains a continuous process designed to improve the transportation system on SJNF and TRFO lands.
- 2.13.11 Motorized and non-motorized users, as well as local, state, tribal, and other federal agencies, are actively engaged in travel management planning, route designation and implementation, and route monitoring on SJNF and TRFO lands.
- 2.13.12 Transportation system components on SJNF and TRFO lands are designed, constructed, and maintained to avoid encroaching onto streams and/or onto riparian areas and wetland ecosystems in ways that impact channel fluctuation or channel geometry (the relationships between channel discharge and channel cross-sectional factors, such as area, width, and depth). Sediment delivery from the transportation system does not measurably impact pool frequency, pool habitat, and/or spawning habitats.
- 2.13.13 The character of roadless areas on the SJNF is maintained in order to preserve large expanses of undeveloped lands that can be managed for wildlife habitat, scenic quality, and recreation.
- 2.13.14 On SJNF and TRFO lands, ensure that all year-round accesses to private in-holdings are authorized by the applicable agency. Roads are upgraded by the proponent, when deemed necessary to meet SJNF or TRFO road standards for traffic type, volume, and season of use.
- 2.13.15 All commercial users, including timber purchasers, land stewardship contractors, and fuels management contractors, perform road maintenance commensurate with their use of SJNF NFS roads in accordance with 16 USC 537 and FSM 7732.22.

## Objectives

- 2.13.16 On the SJNF, transfer jurisdiction of roads identified through travel management planning as having predominant use that is inconsistent with the mission of the jurisdictional managing authority to a managing authority whose mission is consistent with the road use and is willing to accept the road transfer. The SJNF will identify in each travel management planning decision those roads, if any, that are priority for jurisdictional transfer. The SJNF will seek transfer of ownership, to the appropriate managing authority, of 50% of the roads identified as priority for jurisdictional transfer through travel management decisions that are made within the first 5 years following the date of the LRMP's implementation. These jurisdictional transfers will be completed within 15 years of LRMP implementation.
- 2.13.17 Perform maintenance activities annually on 75% of SJNF roads maintained for passenger vehicles (NFS maintenance level 3, 4, and 5 roads).
- 2.13.18 Develop maintenance, monitoring, signing, and implementation plans during the comprehensive travel management planning process, using guidance provided in BLM *H-8342 – Travel and Transportation Handbook* for BLM routes (BLM 2012b). Designated routes will be assigned maintenance intensities at that time. Maintenance objectives by maintenance intensity level are described in Appendix A of BLM Manual 9113, Roads Manual (BLM 2011d).



- 2.13.19 Develop travel management plans in accordance with the designation criteria in 36 CFR 212, Subpart B, for NFS lands and 43 CFR 8342.1 for BLM lands. Routes that are not included in the designated motorized transportation system will be evaluated for their resource impact potential. Those with high potential for resource impacts will be prioritized for decommissioning as part of the implementation plan for each individual travel management plan decision. Each implementation plan will identify those routes prioritized for decommissioning, the method(s) that may be used, and a schedule for completion.
- 2.13.20 Perform the required USFS schedule of condition surveys on SJNF lands for use in prioritizing road maintenance expenditures.

## **Standards**

### ***Roads***

- 2.13.21 SJNF and TRFO road construction and reconstruction must be designed and constructed in accordance with the most recent applicable agency design and construction direction, as well as applicable Federal Highway Administration adopted design standards for the corresponding transportation facility.

### ***Temporary Roads***

- 2.13.22 No temporary road shall be constructed on SJNF or TRFO lands prior to the development of a project-specific plan that defines how the road shall be managed and constructed. The plan must define the road design, who are the responsible parties and their roles in construction, maintenance and decommissioning, the funding source, a schedule for construction, maintenance and decommissioning, the methods(s) for decommissioning, and post-decommissioning monitoring requirements for determining decommissioning success.

## **Guidelines**

### ***Roads***

- 2.13.23 On SJNF and TRFO lands, the use of motor vehicles on roads constructed for specific non-public purposes should be limited to administrative use only.

### ***Temporary Roads***

- 2.13.24 In order to minimize disturbance on SJNF and TRFO lands, temporary roads should be constructed to the minimum standard needed for the specific project (the minimum standard that would provide for the protection of resource values identified during the environmental analysis).

### ***Road and Trail Maintenance***

- 2.13.25 Road and trail maintenance investment on SJNF lands should be prioritized by a travel analysis that categorizes investment priority based on route value to public lands and loss of agency investment, as well as risk to the environment and the traveling public. The following risk categories and strategies should be used to categorize management and investments:
- **High-Value/Low-Risk Routes:** The route condition should be preserved through annual maintenance. Roads in this category that have high value for private access should be considered for transfer to the appropriate jurisdictional managing entity.
  - **High-Value/High-Risk Routes:** These routes should receive first priority for investment and maintenance funding (in order for them to be restored to appropriate standard[s] and to reduce resource risks). Roads in this category that have a high

value for private access should be considered for transfer to the appropriate jurisdictional managing entity.

- **Low-Value/High-Risk Routes:** These routes should receive the highest priority in order to reduce maintenance level or maintenance intensity. Roads in this category may be considered for conversion to trails or otherwise be considered for decommissioning.
- **Low-Value/Low-Risk Routes:** These routes should receive the lowest priority for maintenance funding. Consideration should be given to converting the roads to trails. These routes should be considered for decommissioning or reduction in maintenance level or intensity.

2.13.26 On TRFO lands, maintenance intensities derived from the Roads and Trails Terminology report (BLM 1996b) should be used to guide maintenance activities.

### ***Route Density***

2.13.27 **Road Density Guideline for Water Quality and Watershed Health on SJNF Lands:** In order to protect water quality and watershed function, road densities on SJNF lands should not exceed 2 miles/square mile within any U.S. Geological Survey (USGS) 6th level Hydrologic Unit Code (HUC) watershed. In order to protect major surface source water protection areas for municipalities within USGS 6th level HUC watersheds, road densities on NFS lands should not exceed 1.5 miles/square mile. If new road construction is necessary on NFS lands within an area exceeding this density guideline, management actions should be considered that would result in post-construction road densities that are equal to or less than the pre-construction density.

The following parameters and constraints will be used to calculate road density for water quality and watershed health:

- 2.13.27a Roads used to develop road density calculations include those roads on NFS lands only, regardless of road ownership, that are a) open year-long or seasonally to public use and b) closed to public use, but are used for administrative access or are authorized by contract, permit, or other written authorization. Included in these calculations are NFS maintenance level 2–5 roads. Non-motorized and motorized trails and those roads that are closed to all motorized use and/or are in storage are not used for road density calculations. Temporary roads to be used for 5 years or less are not included in these calculations.
- 2.13.27b Road densities will be calculated within USGS 6th level HUC watersheds on NFS lands only.
- 2.13.27c Municipal watersheds are USGS 6th level HUC watersheds where the surface source water intake exists for an incorporated town, city, or other municipality with a public water supply. The MOU between the USFS Region 2 and the CDPHE states, “Revised Forest Plans will provide direction and desired conditions for municipal supply watersheds/source water areas to protect water quality while allowing for multiple use outputs (per 36 CFR 251.9 and FSM 2542).”
- 2.13.27d Data used for density calculations will be based on the best available information at the time of analysis.

2.13.28 **Road Density Guideline for Water Quality and Watershed Health on TRFO Lands:** In order to protect water quality, watershed function, major surface source water protection areas for municipalities, and to ensure compliance with the Colorado River Basin Salinity Control Act, use the best available information for determining the appropriate level of road density when analyzing and approving management actions that affect motorized routes.

**2.13.29 Road and Motorized Trail Density Guideline for Ungulate Production Areas, Winter Concentration Areas, Severe Winter Range, and Critical Winter Range on SJNF Lands:** The intent of this guideline is to ensure no net loss of existing habitat effectiveness within the areas listed below. In order to maintain wildlife habitat effectiveness of SJNF lands, road and motorized trail densities should be addressed when analyzing and approving management actions that affect motorized routes. Where management actions would result in road and motorized trail densities exceeding 1 mile/square mile on SJNF lands in the areas listed below, actions should be designed to maintain habitat effectiveness on SJNF lands throughout each mapped polygon. Habitat effectiveness for this guideline is considered maintained when road densities within the CPW mapped areas on SJNF lands listed below are less than or equal to 1 mile/square mile. When road densities exceed 1 mile/square mile within the CPW mapped areas on SJNF lands listed below, densities should not be increased without mitigation designed to maintain habitat effectiveness.

- Big game production areas (calving or lambing areas)
- Elk and deer severe winter range
- Elk and deer winter concentration areas
- Deer critical winter range

The following parameters and constraints will be used to calculate road and motorized trail density for wildlife:

2.13.29a Roads used to develop route density calculations include roads on NFS lands only, regardless of road ownership, that are a) open year-long or seasonally to public use and b) closed to public use, but are used for administrative access or are authorized by contract, permit, or other written authorization. Included in these calculations are maintenance level 2–5 NFS roads. Also included for this calculation are NFS trails that are designated for motorized use. Roads and motorized trails with design features sufficient to maintain habitat effectiveness (such as seasonal closures that are determined to be sufficient mitigation), as determined by the USFS biologist, should not be used for final density calculations. Non-motorized trails and those roads that are closed to all motorized use and/or are in storage are not used for route density calculations. Temporary roads to be used for 5 years or less are not included in these calculations.

2.13.29b Data used for density calculations will be based on the best available information at the time of analysis.

**2.13.30 Road and Motorized Trail Density Guideline for Wildlife on TRFO Lands:** In order to maintain wildlife habitat effectiveness of TRFO lands, road and motorized trail densities should be considered in the following areas when analyzing and approving management actions that affect motorized routes:

- Big game production areas (calving or lambing areas)
- Elk and deer severe winter range
- Elk and deer winter concentration areas
- Deer critical winter range

**2.13.31 Road and Motorized Trail Density Guideline for Deer and Elk General Winter Range on SJNF Lands:** Where management actions would result in road and motorized trail densities exceeding 1 mile/square mile and where CPW analysis determines that road and motorized trail densities inhibit the state's ability to meet population objectives, SJNF management actions should be designed to reduce the impacts of road density on habitat effectiveness throughout each mapped general winter range polygon. This guideline applies to the portions of each mapped general winter range polygon not covered under Guideline 2.13.29.

The following parameters and constraints will be used to calculate road and motorized trail density for wildlife:

- 2.13.31a Roads used to develop route density calculations include roads on NFS lands only, regardless of road ownership, that are a) open year-long or seasonally to public use and b) closed to public use, but are used for administrative access or are authorized by contract, permit, or other written authorization. Included in these calculations are maintenance level 2–5 NFS roads. Also included for this calculation are NFS trails that are designated for motorized use. Roads and motorized trails with design features sufficient to maintain habitat effectiveness (such as seasonal closures that are determined to be sufficient mitigation), as determined by the USFS biologist, should not be used for final density calculations. Non-motorized trails and those roads that are closed to all motorized use and/or are in storage are not used for route density calculations. Temporary roads to be used for 5 years or less are not included in these calculations.
- 2.13.31b Data used for density calculations will be based on the best available information at the time of analysis.

## **Additional Guidance**

### ***Guidance and Standards Applicable to NFS Roads***

- FSH 2509.25, Watershed Conservation Practices Handbook
- FSH 2709.12, Road Rights-of-Way Grants Handbook
- FSM 5460, Right-of-Way Acquisition Manual
- FSH 5409.17, Rights-of-Way Acquisition Handbook
- FSM 7100, Engineering Operations Manual
- FSM 7700, Travel Management
- FSH 7709.55, Transportation Planning Handbook
- FSH 7709.56, Road Preconstruction Handbook
- FSH 7709.56b, Transportation Structures Handbook
- FSH 7709.57, Road Construction Handbook
- FSH 7709.58, Transportation System Maintenance Handbook
- FSH 7709.59, Transportation System Operations Handbook
- FSH 7100, Engineering Operations, Region 2 Supplement 7100-2006-1
- Guidelines for Bridge Design, USFS – Pacific Northwest Region (R6) Transportation Structures Group, January 2005
- USFS EM-7700-30, Guidelines for Engineering Analysis of Motorized Mixed Use on National Forest System Roads
- USFS EM 7100–15: Sign and Poster Guidelines for the Forest Service

### ***Guidance and Standards Applicable to NFS Trails***

- FSM 2300, Recreation, Wilderness, and Related Resource Management; Chapter 2350, Trail, River, and Similar Recreation Opportunities
- FSH 2309.18, Trails Management Handbook
- Motor Vehicle Route and Area Designation Guide, USFS (v.111705)

### ***Guidance and Standards Applicable to BLM Roads and Trails***

- BLM Handbook H-8342 Travel and Transportation Handbook (Public) (BLM 2012b)
- BLM Manual 9113 Roads Manual (2011d)
- BLM Handbook H-9113-1 Road Design Handbook (2011e)
- BLM Handbook H-9113-2 Roads National Inventory and Condition Assessment Guidance and Instructions Handbook (2011f)
- BLM Roads and Trails Terminology, Technical Note 422, November 2006 (BLM 2006b)
- BLM Handbook H-9115-1 Primitive Roads Design Handbook

- BLM Handbook H-9113 Primitive Roads National Inventory and Condition Assessment Guidance and Instructions Handbook
- BLM Manual MS-1626 Travel and Transportation Manual (Public) (2011g)
- BLM Manual MS -9130 Sign Manual

***Standards Applicable to Both Agencies***

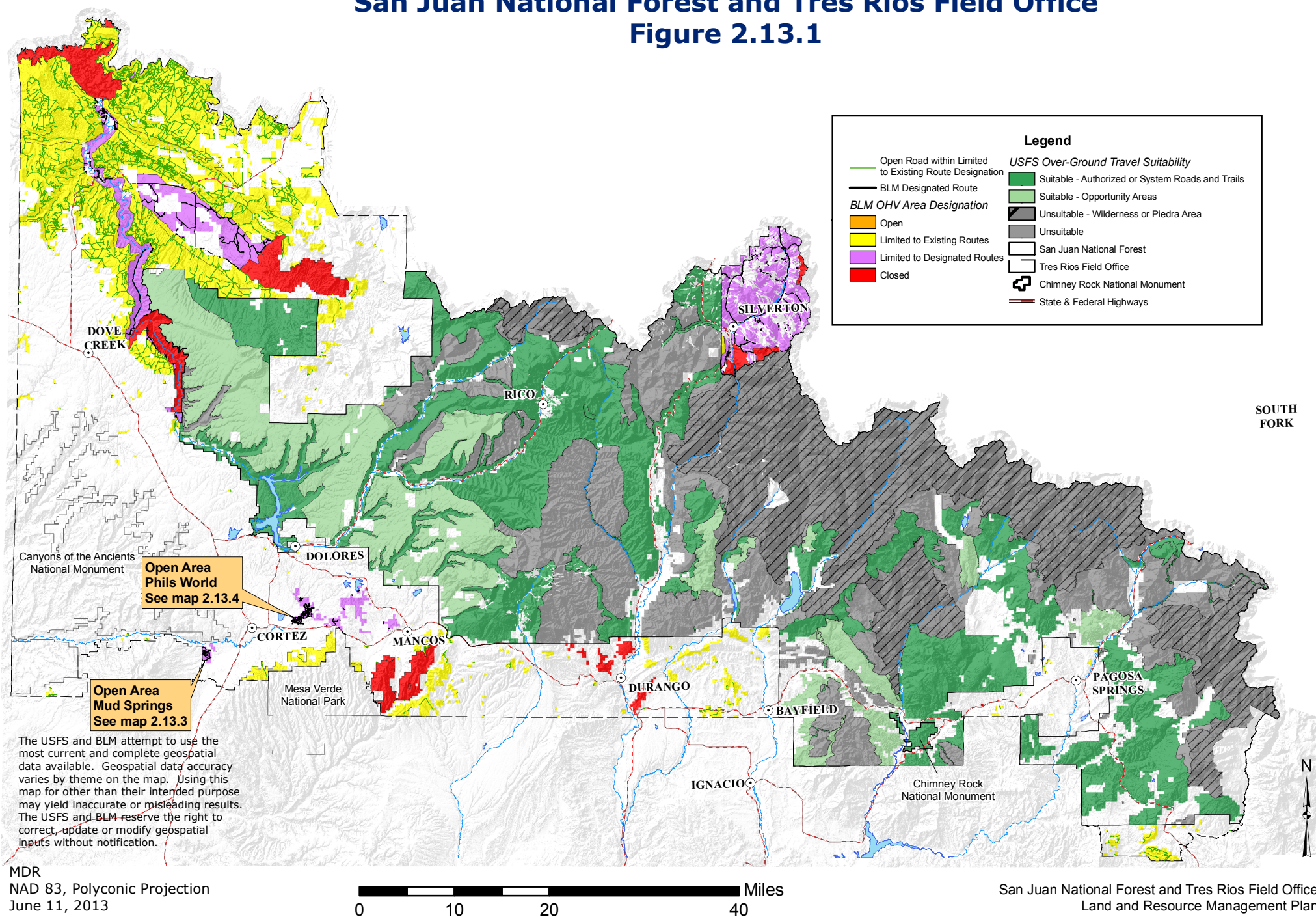
- Manual on Uniform Traffic Control Devices, Part 5. Traffic Control Devices for Low-Volume Roads
- American Association of State Highway and Transportation Officials Guidelines for Geometric Design of Very Low-Volume Local Roads (Average Daily Traffic  $\leq 400$ ), current edition
- Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development (USDI and USDA 2007)
- American Association of State Highway and Transportation Officials HB-17 Standard Specifications for Highway Bridges, current edition



# Over-Ground Travel Suitability and OHV Area Designations

## San Juan National Forest and Tres Rios Field Office

### Figure 2.13.1

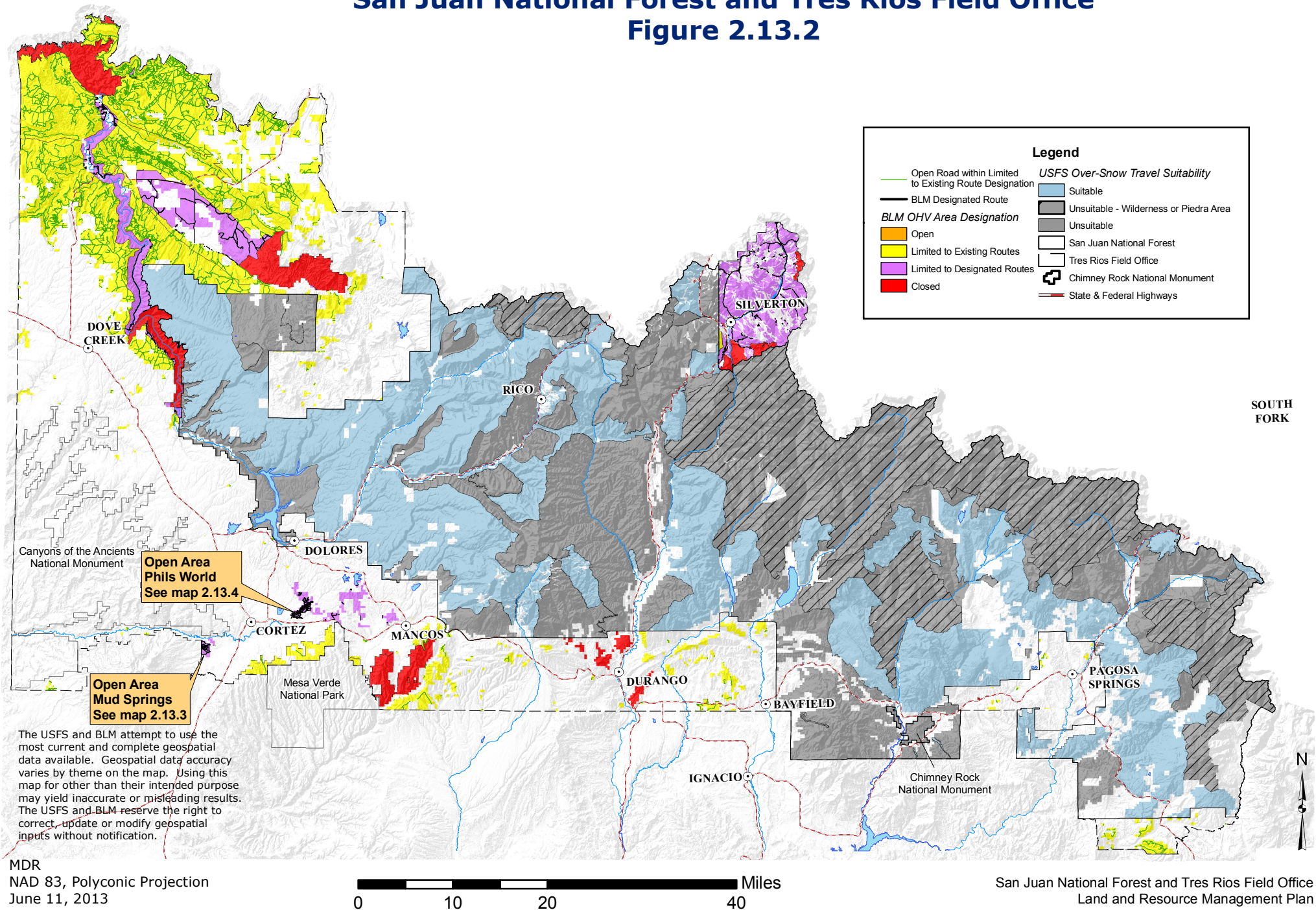




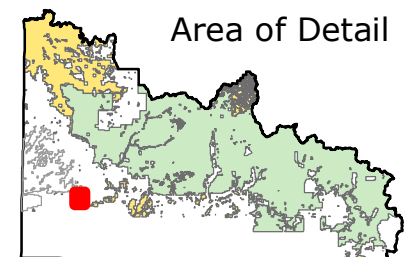
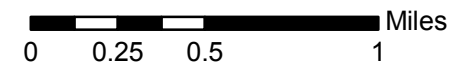
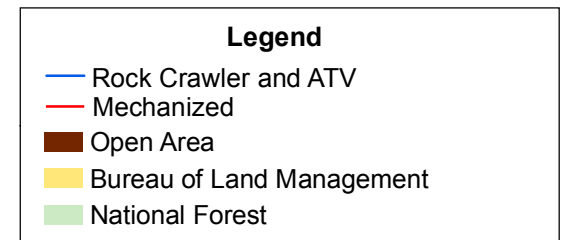
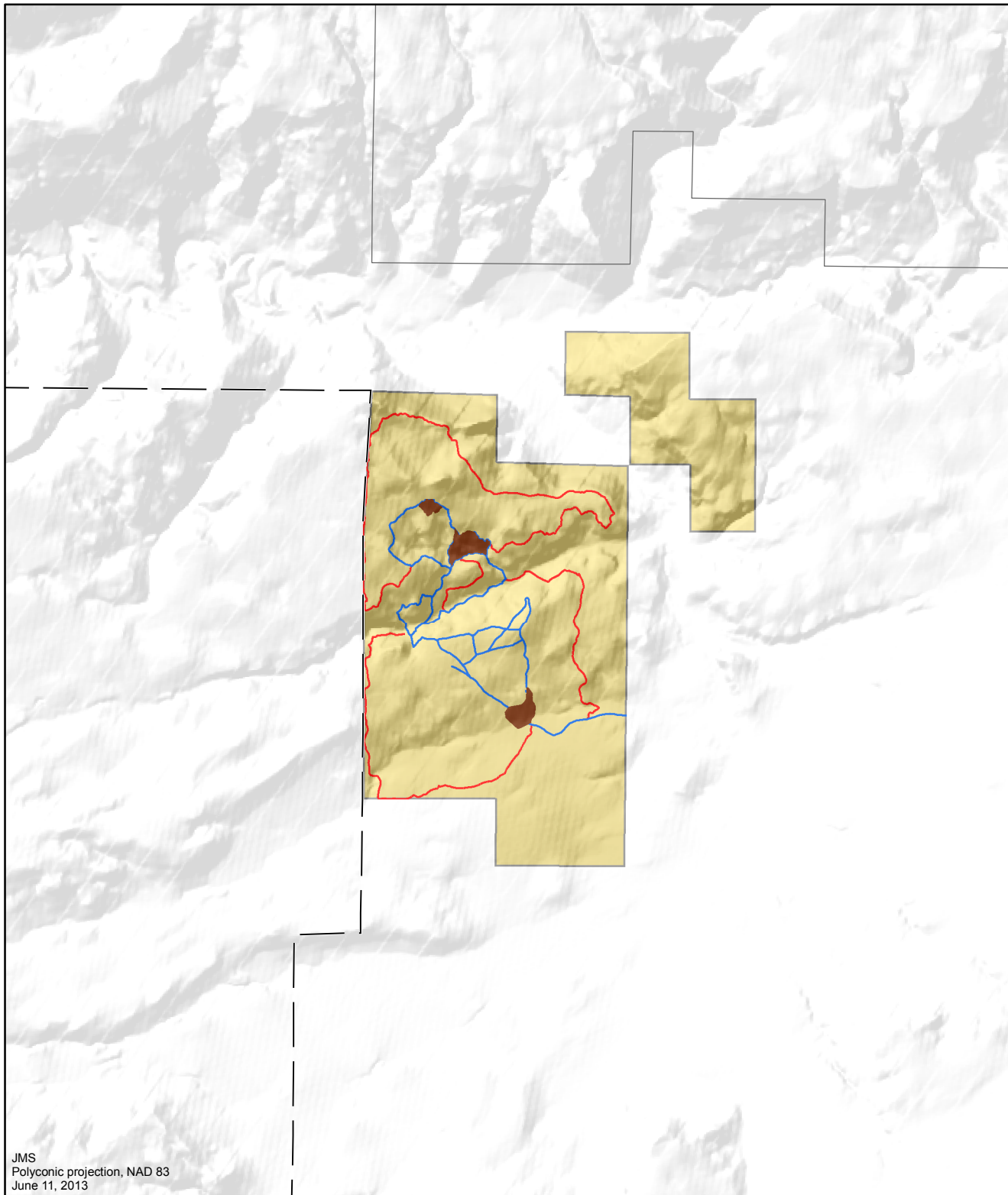
# Over-Snow Travel Suitability and OHV Area Designations

## San Juan National Forest and Tres Rios Field Office

### Figure 2.13.2



# Mud Springs Designated Routes Tres Rios Field Office Figure 2.13.3



The USFS and BLM attempt to use the most current and complete geospatial data available. Geospatial data accuracy varies by theme on the map. Using this map for other than their intended purpose may yield inaccurate or misleading results. The USFS and BLM reserve the right to correct, update or modify geospatial inputs without notification.

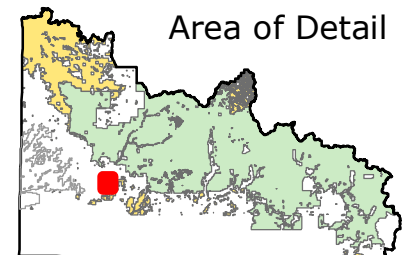
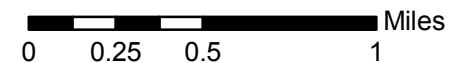
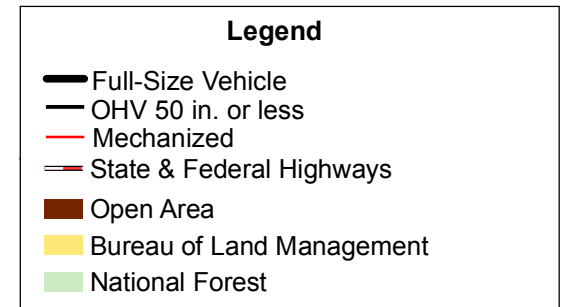


# Phil's World

## Designated Routes

### Tres Rios Field Office

#### Figure 2.13.4



The USFS and BLM attempt to use the most current and complete geospatial data available. Geospatial data accuracy varies by theme on the map. Using this map for other than their intended purpose may yield inaccurate or misleading results. The USFS and BLM reserve the right to correct, update or modify geospatial inputs without notification.

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